FUNCTIONAL SERVICING AND PRELIMINARY STORMWATER MANAGEMENT REPORT

ANCASTER SULPHUR SPRINGS DEVELOPMENT
159 & 163 SULPUR SPRINGS ROAD

CITY OF HAMILTON

PREPARED FOR:

MIZRAHI DEVELOPMENTS
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PREPARED BY:

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1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) was retained by Mizrahi Developments to complete a Functional Servicing and Preliminary Stormwater Management Report in support of an Official Plan Amendment and Zoning By-Law Amendment Application for a proposed residential development at 159 and 163 Sulphur Springs Road located in the City of Hamilton (City), within Niagara Region (Region). The proposed development will herein be referred to as the Subject Development/Subject Lands.

The Subject Lands are approximately 10.1 ha and located in a residential neighbourhood bounded by forested areas, a large pond and Heritage Trail to the north, a commercial property to the east, Sulphur Springs Road and existing dwellings to the south with a small adjacent pond, and residential properties to the west. Two (2) residential dwellings occupy the site, accessed through a private road off Sulphur Springs Road. Refer to **Figure 1** for the Site Location Plan.

Per the proposed Concept Plan (The Biglieri Group, October 2024), the Subject Development is comprised of single detached and townhouse block residential units, parkland and open space blocks, private right-of-way allowances with road, sidewalk and parking, natural heritage lands, and landscaped areas, a sewage pumping station, and underground stormwater management facilities. The proposed Concept Plan has been provided as **Figure 2**.

Per the Concept Plan, the following unit count is proposed:

- 14 single detached residential units
- 61 townhouse residential units

The proposed servicing and stormwater management strategy outlined herein is predicated on the Concept Plan referenced above.

Mizrahi Developments has assembled a multi-disciplinary team which includes The Biglieri Group (Planner), SLR Consulting (Canada) Ltd. (SLR) (Natural Heritage, Hydrogeological, Geotechnical, and Environmental), Archaeological Consultants Canada (Archaeological) (ACC), GEO Morphix (Fluvial Geomorphology), and Crozier (Civil and Transportation Engineering). These consultants have prepared studies/plans to support the planning application. This report prepared by Crozier should be read in conjunction with the work of the other consulting team members.

This Functional Servicing and Preliminary Stormwater Management Report has been prepared to outline the proposed servicing, grading and stormwater management strategy for the Subject Lands.

2.0 SITE DESCRIPTION

As described above, the Subject Lands are currently characterized by residential dwellings, wooded and natural areas, and ponds. The north pond is a larger pond presumed to be a natural feature that has been modified historically to provide a larger area for recreational purposes (with a berm at the northern end). The south pond is much smaller in size and presumed to be a shallow dug pond for aesthetic use by the former homeowner. An existing watercourse traverses the site at both the northern and southern limits in a west-east manner. The Subject Lands are designated by the Niagara Escarpment Commission with the northern portion of the site residing within Escarpment Natural Area and the southern portion within Escarpment Protection Area. An existing wetland is situated just east of the site.

A topographic survey was completed for the Subject Lands by Barich Grenkie Surveying Ltd. on April 28, 2022. This survey Is referenced within the provided figures. There is an approximate 35 m elevation difference across the site, generally sloping from south to north. Refer to **Appendix A** for the topographic survey.

3.0 BACKGROUND

The Subject Development is currently zoned Agricultural (A) and Conservation / Hazard Land – Rural Zone (P6) in the Current permitted uses include agriculture, conservation, flood and erosion control facilities, recreation, passive secondary uses to agriculture, single detached dwelling.

Several documents/plans were reviewed during this engineering assessment. They include:

- City of Hamilton Water and Wastewater Master Plan (KMK Consultants Limited, November 2006)
- Water, Wastewater and Stormwater Master Plans Virtual PIC (City of Hamilton, May 2023)
- Drinking Water Systems Annual Water Quality and Summary Report (City of Hamilton, 2023)
- Wastewater Treatment Facilities Annual Report (City of Hamilton, 2023)
- City of Hamilton Stormwater Master Plan (Aquifor Beech Limited, May 2007)

4.0 ROAD STANDARD

Access to the Subject Development will be provided by one (1) split connection to Sulphur Springs Road to allow for secondary emergency vehicle access with minimum 6 m width lanes. Within the development, the road network will consist of private condominium roadways with varying widths suitable to accommodate internal traffic, all underground services, and utilities as well as boulevard features. Typical right-of-way width is 20.5 m from building face to building face, with pavement widths varying from 6 m to 7.5 m coupled with 1.5 m sidewalks on one side.

A comprehensive Traffic Impact Study (TIS) was prepared by Crozier for the Subject Lands and surrounding developments for inclusion in this application under separate cover.

5.0 SITE GRADING

The site grading will be influenced by the existing and proposed drainage systems within the Subject Development. Grading will tie into the existing elevations along the property limits, match the pre-development overland stormwater flow patterns where possible and provide sufficient cover for the proposed water, sanitary and storm servicing.

The road network will have slopes at or greater than 0.5% and generally less than 5% except for at the access to the site and along the northern part of the road network in order to follow existing topography to the extent feasible and limit the amount of required fill. In these areas, the road slopes vary from 6.0% to 8.8%. Future technical submissions will investigate the feasibility or additional fill in the north section of the development to flatten the road network should it be deemed necessary. Grading of roadways will be completed to ensure no flooding of private property, nor will flow depths greater than 0.30 m occur during the 100-year storm event.

Groundwater monitoring for the Subject Development is ongoing by SLR and the results of which will be included in subsequent submissions. Preliminary groundwater elevations are available in the Geotechnical and Hydrogeological reports submitted under separate cover as part of this application package. Basement elevations will be set to ensure minimum 0.3 m of clearance is maintained above the observed high groundwater level per City standards. If for extenuating circumstances the requisite City criteria of 0.3 m separation from basements cannot be achieved, the use of sump pumps and foundation water proofing will be used. As part of this functional level design submission, centreline road grades, block grades, and boundary grades have been provided on the figures herein to confirm grading limits within the site constraints, and demonstrate post-development functionality of the site including assurance of positive drainage of lands to stormwater management facilities and requisite cover is provided on all services per City standards to facilitate both frost cover and serviceability of lot laterals to homes. Individual lot grading will be provided at the detailed design stage. Refer to **Figure 3** for the Preliminary Grading Plan.

6.0 SANITARY SERVICING

6.1 Existing Sanitary Infrastructure

Existing sanitary servicing for the City of Hamilton is divided up into two (2) main sewer servicing areas. The first is a combined sewer system where stormwater and wastewater flow through a common sewer. The second is a conventional network of sewers conveying wastewater flow by gravity and in some instances, sewage pumping stations and forcemains. The flows ultimately outlet to either the Dundas Wastewater Treatment Plant on the west end of the City discharging to the Desjardins Canal, or the Woodward Wastewater Treatment Plant, located in the northeast quadrant of the City and discharging to the Hamilton Harbour (Water, Wastewater and Stormwater Master Plans Virtual PIC (City of Hamilton, May 2023).

The existing houses on the property are on private services (septic) as the site borders the Ancaster Wastewater System (**Appendix B** contains the relevant Master Planning excerpt showing the Subject Lands's proximity to the City's sewershed). There is City wastewater infrastructure located adjacent to and around the Subject Development. A concrete 375 mm diameter sanitary sewer fronts the site on Sulphur Springs Road, conveying flows from west to east. This sewer is part of a network discharging to an existing sewage pumping station (SPS) at the intersection of Mansfield Drive and Sulphur Springs Road (Unit ID HC010). The SPS sends wastewater flows through a 200 mm diameter forcemain running south on Mansfield Drive and Reding Road, where it connects to the gravity trunk network on Wilson Street East to eventually drain to the Woodward Wastewater Treatment Plan, the ultimate receiver. Refer to **Appendix C** for relevant as-constructed drawings provided by the City.

6.2 Proposed Sanitary Servicing Strategy

The functional servicing analysis evaluated alternatives to service wastewater flows from the Subject Development.

Alternative 1

The proposed sanitary servicing strategy for the Subject Development will be to service by an internal network of gravity sewers following the alignment of the internal roadways. Sanitary sewers will be designed and constructed in accordance with City design standards, at a size and depth sufficient to service each lot and building and avoid conflicts with other services and utilities. Based on the existing topography of the site and the elevation of the existing sewer on Sulphur Springs Road, wastewater collected by the proposed gravity sewers will drain to a proposed private SPS at the north limit of the developed portion of the Subject Lands. A private forcemain will send the wastewater from the SPS back through the road network and connect to a transition manhole at

the limit of the Subject Development, north of Sulphur Springs Road. A gravity outfall from this manhole will connect into the existing 375 mm diameter sewer on Sulphur Springs Road. Refer to **Figure 4** for the General Servicing Plan depicting this strategy and Section 6.3 for the Preliminary Sewage Pumping Station design summary.

Preliminary sanitary flows for the Subject Development were estimated in conjunction with City standards. Applicable sanitary design criteria have been summarized in **Table 1**.

Table 1: Sanitary Design Criteria

Criteria	City of Hamilton
Average Flow Rate (L/cap/day)	360
Infiltration (L/s/ha)	0.40
Single Detached (ppha)[1]	60
Block Townhouses (ppha)[2]	110
Peaking Factor (Babbitt Formula)[3]	5.00

1. Converted to 3.96 ppu to match site statistics of "B" units per Concept Plan by Biglieri Group
2. Equates to 2.67 ppu.
3. Contributing population <1000

Based on the criteria in **Table 1** and unit counts proposed, it is estimated that the Subject Development will have:

- Total Peak Daily Flow = **7.1 L/s**

Appendix D contains the sanitary demand calculations.

Internal gravity sewers required to service the proposed development range in diameter from 200 mm to 300 mm. The HC010 SPS was not included in the City's Wastewater Treatment 2023 Annual Report, so capacity and planned upgrades of this station are unknown at this time. However, the additional flow from the Subject Development is relatively small and it is expected the station will be able to accept the additional flow. Confirmation of the station's capacity and a downstream analysis of the external sanitary sewer network will be undertaken as part of subsequent engineering submissions to confirm the capacity of the receiving sewer(s).

Alternative 2

Alternative 2 would have the single detached units at the north on low-pressure grinder systems and pumping wastewater flows to the highpoint in the middle of the site, where the gravity system would drain internal to the site south to a proposed lift station at the south property limits prior to discharging into the existing City sanitary system. This alternative will be designed under future technical submissions should it be deemed desirable by the City.

Alternative 3

Should the downstream capacity analyses under the other alternatives determine the existing sewage pumping station cannot currently service the Subject Development and/or upgrades are not feasible, the *Alternative 3* sanitary servicing strategy that would be recommended is on-site treatment through a Newterra system (or approved equivalent). This would be a similar internal strategy to *Alternative 1* but at the low point of the site, the SPS would be replaced with the on-site treatment system. Confirmation on the footprint, layout, location, and configuration as well as other design details will be undertaken under future technical engineering submissions if necessary.

Recommended Alternative

Based on a high-level analysis of the alternatives, *Alternative 1* is the recommended approach to propose a private sewage pumping station at the north end of the developed portion of the site, capturing all of the flows from the development and pumping them up to Sulphur Springs Road and eventually connecting to the existing gravity sewer. Confirmation of this proposed strategy will be undertaken through subsequent technical submissions and through consultation with the Regulatory Agencies.

6.3 Preliminary Sewage Pumping Station Design

As discussed in Section 6.2, a private sewage pumping station is proposed for the Subject Development. A preliminary design was undertaken to confirm the feasibility of the station to service the development as proposed. **Table 2** summarizes the key design parameters we expect required for the proposed SPS.

Table 2: Sewage Pumping Station Design Summary

Pumping Station Design – 7.1 L/s, 550 m Forcemain
• Pre-Packaged fibreglass pumping station by a single vender • Wet well style station c/w submersible pumps and a valve chamber • Wet well estimated to be 2.4 m to 3 m in diameter and 6 to 8 meters deep • Exterior grade electrical panel c/w soft starters for the pumps • 2 pump configuration, both sized for full flow (1 duty and 1 standby) – 600v/3phase/60 Hz power required • Pump size between 10 and 14 hp • Wet well to include a level transmitter and level floats for backup operation • Valve chamber to contain gate valves, check valves, and a combination air valve • Backup power provided by an onsite diesel generator with an auto-transfer switch – Generator to contain sound dampening enclosure • Minimum of 30 minutes emergency storage at peak flow conditions stored in the wet well. Additional storage can be located with the upstream infrastructure or an on-site storage chamber. • Forcemain to be 100 mm HDPE DR 13.5 (IPS)

The SPS and associated forcemain will be privately owned (by the Condominium Corporation), and operated by a third-party contractor (e.g. Ontario Clean Water Agency). The proposed design will be refined through subsequent technical engineering submissions and through additional exploratory investigations. Further discussion and consultation with the City will be required to confirm the ownership and details of the proposed outfall connection to the existing Sulphur Springs Road sewer main.

7.0 WATER SERVICING

7.1 Existing Water Infrastructure

Potable water for the City municipal distribution system is drawn from Lake Ontario and treated at the Woodward Avenue Water Treatment Plant (known as The Hamilton Drinking Water System, Woodward Subsystem). The water is pumped throughout the City through a distribution system of feedermains to various water pumping stations throughout the City, which provide several different Pressure Districts to account for the variable topography in the area. Fire flow storage and emergency water use is provided by in-ground reservoirs and above ground tanks. Water is treated by a pre-chlorination system at the Woodward Ave Plant (KMK, 2006).

It is understood that two (2) private wells on the Subject Lands provide drinking water to the existing dwellings. The Subject Lands are situated within Pressure District 18 in the City's distribution system (**Appendix B** contains the relevant Master Planning excerpt showing the Subject Lands within the City's Pressure District 18, confirmed by online GIS mapping from the City's website). The water pumping station for this Pressure District is located northwest of the site on Sulphur Springs Road, eventually sending water to a 200 mm dia. Class 52 D.I. cement lined watermain next to the proposed development's access. This watermain terminates approximately 20 m east of this access with a 200 mm plug and anchor block coupled with a 50 mm dead-end blow off. A 200 mm dia. Class 52 D.I. watermain also runs along Sulphur Springs Road east of the Mansfield Drive, reducing to a 150 mm dia. watermain on Mansfield. Relevant as-constructed drawings have been included in **Appendix C**.

7.2 Proposed Internal Water Servicing Strategy

Watermain internal to the Subject Development will follow the alignment of the internal road network complete with individual service connections for each lot and building. Fire hydrants will be spaced as required to provide the necessary fire protection and to meet City standards. Dead ends and turnarounds will be coupled with hydrants and blow-offs, and auto-flushers as needed for water turnover requirements. The preliminary water distribution layout is shown on the General Servicing Plan (**Figure 4**).

Preliminary water demands for the Subject Development have been estimated in conjunction with City Standards that concur with Table 3-1 of the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems. Applicable design criteria have been summarized in **Table 3**.

Table 3: Watermain Design Criteria

Criteria	City of Hamilton/MECP
Average Flow Rate (L/cap/day)	360
Maximum Day/Peak Hour[1]	2.75/4.13
Single Detached (ppha)[2]	60
Block Townhouses (ppha)[3]	110

1. Converted to 3.96 ppu, see comment explanation
2. Equates to 2.67 ppu.
3. Contributing population <1000

Additional boundary condition criteria was obtained from the City for modelling in WaterCAD, which is detailed in Section 7.5. The following water demands have been calculated for the Subject Development per the standards presented above:

- Average Daily Flow Rate – 0.9 L/s
- Max Daily Flow Rate – 2.5 L/s
- Peak Hour Flow Rate – 3.8 L/s

Refer to **Appendix E** for the preliminary water demand calculations.

7.3 Proposed External Water Servicing Strategy

This section describes the proposed connection from the internal watermain system to the existing watermain on Sulphur Springs Road and the recommended external upgrades to the Hamilton Drinking Water System.

Watermain internal to the site will be private and therefore a water meter chamber at the property is proposed prior to the connection to the existing watermain. The connection to the existing watermain system requires further discussion and consultation with the City, however, we recommend external upgrades to facilitate the Subject Development.

Due to the dead-end watermain adjacent to the site and its proximity to the watermain at the Sulphur Springs Road and Mansfield Drive intersection, it is proposed to connect the existing 200 mm dia. watermain on Sulphur Springs Road to the existing loop at the noted intersection. Connecting the external watermains to create a looped/interconnected system offers benefits to the City's water distribution network to improve water quality by ensuring continuous flow and effective disinfection, increased redundancy and system resiliency, enhanced hydraulic performance, and adequate fire flow. Refer to **Figure 4** for the proposed watermain configuration. It is unknown why the existing watermains were not previously connected.

The watermain internal to the Subject Development would connect to this extension of the existing watermain from the proposed water meter chamber at the property line. Additional modelling and watermain hydraulic analysis will be coordinated with the City to confirm the viability and implementation of this proposed strategy as needed to confirm no adverse impacts occur to the existing system.

7.4 Fire Flow Requirements

Based on City Standards, fire flow requirements are calculated per the Fire Underwriters Survey (FUS 1999). Scenarios were calculated for the proposed townhouse units and single detached units within the Subject Development. It was determined that the required fire flow for the Subject Development is 100 L/s and the required storage is 720 m^3. Hydrant flow testing is recommended to confirm that the required fire flow maintains minimum pressures and volume throughout the existing watermain network. Refer to **Appendix D** for the FUS calculations.

7.5 Water Modelling

Boundary conditions for the watermain at the site limits were requested on October 31, 2024, from the City, and were provided on November 21, 2024. Based on expedited submission timelines, preliminary water modelling was undertaken for the internal network to confirm sizing, layout, and fire flow requirements. It is recommended that a full Watermain Hydraulic Analysis Report be completed per City of Hamilton standards as part of future technical submissions. Hydrant flow testing results should also be included to update and calibrate the City's model accordingly.

A preliminary WaterCAD model was completed based on the proposed watermain layout and size shown on the Site Servicing Plan (C702).

7.5.1 Hydraulic Model Scenarios/Boundary Conditions

Multiple scenarios were set up in the model to determine the pressures and velocities available under average day, maximum day, and maximum day plus fire flows for both the 2021 and 2031 conditions.

Boundary conditions for the year 2021 were run with reservoir HDR18 set to 50% (233.0 m) and 75% (234.6 m) for both average day and maximum day scenarios. The same scenarios were run for the year 2031.

A total of four fire flow scenarios were run simultaneously with maximum daily demands. Two scenarios were run for the year 2021 with reservoir levels at HDR18 set to 50% and 75% and two for the year 2031 with reservoir levels at 50% and 75%.

The pumping station within Pressure District 18 was set according to the boundary conditions. This was achieved by setting pumps 1, 2 and 4 (HLP01, HLP02 and HLP04) at HDR18 off and pump 3 (HLP03) set to on. Please refer to the email correspondence provided in **Appendix E** for further details on scenarios, including reservoir levels and pump configurations.

7.5.2 Analysis Results

The following sections describe the results of each scenario run, including average day, maximum day, and maximum day plus fire flow for 2021 and 2031 conditions.

Average Day & Maximum Day

The average day and maximum day scenarios for both 2021 and 2031 with reservoir levels set to 50% and 75% at HDR18 were run with the addition of the proposed development. The results for the development are summarized below.

Table 4: Water Model Results – ADD & MDD

Year	Demand Scenario	Reservoir Level	Minimum Pressure (psi)	Maximum Pressure (psi)
2021	ADD	50%	98	124
		75%	98	124
	MDD	50%	97	123
		75%	97	123
2031	ADD	50%	98	124
		75%	98	124
	MDD	50%	96	123
		75%	96	123

As shown, pressures within the development exceed the max allowable pressure of 100 psi per City design standards. This is due to the significant fall in elevation within the site, causing a grade differential of approximately 22 m. Therefore, pressure reducing valve devices may be required to reduce pressures within the site to meet City requirements. Refer to **Appendix E** for further details of the 2021 results.

7.6 Max Day + Fire Flow

The maximum day and fire flow scenarios for both 2021 and 2031 with reservoir levels at HDR18 set to 50% and 75% were run and compared to the City of Hamilton standards. It should be noted that a 2031 fire flow scenario for Pressure District 18 was not included in the model provided by the City. Therefore, the scenario for Pressure District 19 was duplicated and updated accordingly.

Pressures within the site achieve the minimum allowable pressure of 140 kPa. The available fire flow throughout the site is summarized in **Table 5**.

Table 5: Water Model Results – MDD + FF

Year	Reservoir Level	Min Available Fire Flow (L/s)	Max Available Fire Flow (L/s)
2021	50%	91	105
	75%	93	107
2031	50%	63	90
	75%	66	90

The minimum available fire flow throughout the site during the 2021 scenarios is just below the required 100 L/s as determined by the FUS calculations. The maximum available fire flow at the connection point is approximately 112 L/s. This is likely due to the dead end of the 200 mm diameter watermain along Sulphur Springs Road. As noted in Section 7.3 above, external improvements are proposed to connect the existing 200 mm diameter watermain on Sulphur Springs Road to the existing loop at the Sulphur Springs Road and Mansfield Drive intersection. Further modeling is required to determine the impacts of the external improvements on the site's available fire flow. Increasing the available fire flows within the site should be further investigated as part of the full Watermain Hydraulic Analysis Report and available flows should be confirmed with hydrant flow testing.

8.0 STORMWATER MANAGEMENT

Stormwater Management Design Criteria

The management of stormwater from the Subject Development must comply with the policies and standards of:

- The City of Hamilton
- Hamilton Conservation Authority (HCA)
- The Ministry of the Environment, Conservation and Parks (MECP)

A stormwater management strategy and accompanying recommendations regarding the proposed development have been included below:

- Water Quantity Control
    - Control of the post-development peak flows to pre-development levels for all storms up to and including the 100 year storm event.
- Water Quality Control
    - "Enhanced Protection" per MECP (80% long-term average Total Suspended Solids (TSS) removal).
- Erosion Control
    - Best-efforts approach to on-site retention per Regulatory requirements, confirmed during subsequent design submissions.

- Water Balance
    - Best effort to achieve post-development annual infiltration volumes at or above pre-development levels. Refer to Section 9.0 for more details on low impact development and infiltration opportunities.
- Development Standard
    - Urban cross-section complete with 100-year storm sewer system.
    - Lot grading at 2% optimum.
    - Minor/major drainage system to convey frequent and infrequent rainfall/runoff events.
- External Drainage Management
    - Total external drainage of 10.73 ha is conveyed through the Subject Lands under existing conditions, 2.99 ha of which contributes to the existing wetland east of the site, and 7.74 ha contributes to the existing large pond to the north. The stormwater management strategy for the Subject Development must accommodate these external flows to ensure safe conveyance.

8.1 Pre-Development Conditions

As discussed in Section 2.0, the Subject Lands are currently characterized by residential dwellings, wooded and natural areas, and ponds. Based on the existing contours, a portion of the Subject Development currently drains to the larger pond at the north end of the site which outlets to Sulphur Springs Creek. The remainder of the development feeds the existing wetland to the east.

To facilitate the pre-development stormwater analysis, the seven (7) catchments have been delineated based on the existing drainage conditions and will drain into the proposed development area. Any area, Internal or External, that does not drain into the proposed development area has been excluded from the model. For areas within the property limits that have no proposed changes they are not captured by either of the SWM Facilities, these areas will continue to drain uncontrolled as they do under pre-development conditions. **Tables 6 and 7** provides a summary of the parameters assigned to the internal and external catchments for the pre-development model. Refer to **Appendix F** for the pre-development hydrologic parameter sheets. The pre-development drainage conditions have been presented in **Figure 5**.

Table 6: Pre-Development STANDHYD Parameters

Catchment	Area (ha)	TIMP (%)	XIMP (%)	SLPP (%)	LGP (m)	SLPI (%)
PRE-9A	1.07	20	8	7.1	70	1
PRE-10	0.26	45	45	2.0	42	2

Table 7: Pre-Development NASHYD Parameters

Catchment	Area (ha)	CN	IA (mm)	TP (hr)
PRE-5A	7.57	70.2	6.22	0.29
PRE-5B	0.17	55.0	10.00	0.15
PRE-7	2.73	70.3	6.53	0.09
PRE-12	2.47	78.5	4.44	0.18
PRE-13	3.87	76.5	4.69	0.19

8.2 Proposed Drainage Conditions

The Subject Development will be constructed to a fully urbanized system complete with curb and gutter, and storm sewers. The drainage system will consist of storm sewers and catch basins sized to convey the 100-year design storm event. Overland flow routes within the road allowance are designed to safely convey the regional storm event, Hurricane Hazel. The preliminary storm servicing layout is presented in **Figure 4**.

To meet the SWM criteria, the minor and major storms will be conveyed to one of two underground stormwater management facilities: SWM Facility 1 (North) and SWM Facility 2 (South). SWM Facility 1 is located in the north half of the Subject Development and will outlet to the existing large pond and ultimately Sulphur Springs Creek. SWM Facility 2 is located in the south portion of the Subject Development and will outlet to the private lands/existing wetland to the east.

Each SWM Facility is located such that they respect all environmental constraints, including erosion hazards, wetland setbacks and driplines. Refer to the Environmental Impact Study by SLR Consulting Ltd. (2024) for additional information regarding the environmental constraints within the Subject Lands.

To facilitate the post-development stormwater analysis, nine (9) catchments have been delineated based on the proposed drainage conditions. **Tables 8 and 9** provide a summary of the parameters assigned to the internal and external catchments for the proposed condition model. Refer to **Appendix F** for the proposed hydrologic parameter sheets. The post-development drainage conditions have been presented in **Figure 6**.

Table 8: Post-Development STANDHYD Parameters

Catchment	Area (ha)	TIMP (%)	XIMP (%)	SLPP (%)	LGP (m)	SLPI (%)
POST-9A	1.07	20	8	7.1	70	5
POST-10	0.26	45	45	2	42	2
POST-12A	1.82	58	32	2	20	1
POST-12B	0.65	23	23	2	70	1
POST-13A	2.38	37	18	2	20	5

Table 9: Post-Development NASHYD Parameters

Catchment	Area (ha)	CN	IA (mm)	TP (hr)
POST-5A	7.57	70.2	6.22	0.29
POST-5B	0.17	55.0	10.00	0.15
POST-7	2.73	70.3	6.53	0.09
POST-13B	1.50	75.3	4.84	0.13

8.3 Hydrologic Analysis

Hydrologic modelling was prepared for the pre-development and post-development scenarios using the stormwater management computer program Visual OTTHYMO (VO). The purpose of the modelling was to determine the detention storage volumes and corresponding SWM tank sizing required for the Subject Lands so post-development peak flow rates do not exceed the pre-development target flows (i.e., quantity control).

The 2, 5, 10, 25, 50 and 100-year rainfall was simulated using a 3 hour Chicago distribution using the IDF Parameters for Mount Hope, as well as the regional storm event, in accordance with municipal design standards.

Percent impervious was calculated using GIS tools and verified using satellite imagery. To calculate the percent impervious, land use mapping was used to identify the land use and ground cover in each catchment.

Soil types were mapped and classified using the OMAFRA GIS Soil Survey Complex by Ontario GeoHub. Geotechnical investigations were undertaken by SLR/Palmer and being reported on under separate cover, the results of which will be used to confirm soil characteristics during subsequent technical submissions.

8.3.1 Pre-Development Model Setup

The purpose of modelling the existing conditions is to establish pre-development flow conditions through the Subject Lands. Peak flows will be used as targets for the proposed stormwater management controls. Please refer to **Appendix G** for VO schematics.

8.3.2 Post-Development Model Setup

The post-development model was created using the catchments identified in Section 8.2 and with the inclusion of stormwater management controls. The VO schematic can be found in **Appendix G**.

As required, the post development peak flows are to be controlled to pre-development levels for all storms up to and including the 100-year storm. As such, peak flows were controlled for each SWM Facility until the respective targets were met. The model also incorporated the regional storm event for future analysis to confirm safe conveyance through the overland flow route to the Site's outlets.

As evident by **Table 10**, 'Post-to-Pre' quantity control has been provided for storm events up to and including the 100-year events. It is noted that the pre- to post-development flow control requirements for the regional storm event were not met. However, this is acceptable as the primary objective for this site is to provide safe conveyance of regional storm flows. All necessary measures are in place to direct the excess flow safely off-site without causing adverse impacts to downstream infrastructure or the surrounding area.

Table 10: Quantity Control Flow Rates

Return Period (Year)	SWMF 1 (North)			SWMF 2 (South)		
	Pre (m^3/s)	Post (m^3/s)	Δ (Pre – Post) (m^3/s)	Pre (m^3/s)	Post (m^3/s)	Δ (Pre – Post) (m^3/s)
2	0.186	0.155	0.031	0.167	0.145	0.022
5	0.373	0.325	0.048	0.299	0.246	0.053
10	0.541	0.492	0.049	0.431	0.385	0.046
25	0.782	0.744	0.039	0.632	0.537	0.095
50	0.964	0.925	0.039	0.780	0.643	0.137
100	1.176	1.135	0.041	0.951	0.785	0.166
Regional	1.583	1.679	-0.096	0.906	0.936	-0.053

8.4 Quality Control Analysis

Stormwater quality to an Enhanced Protection Level (Stormwater Management and Design Manual, MECP, 2003) will provided by Imbrium Jellyfish units (or approved equivalent) and a pre-treatment chamber for the contributing drainage areas for SWM Facility 1 (North) and SWM Facility 2 (South). One Jellyfish Filter unit (OGS) is proposed for SWMF1 and another is proposed for SWMF2 upstream of the tanks at each inlet. All units will be sized for 80% TSS removal, service 90% of runoff, and are ETF Canada verified.

8.5 Stormwater Management Facility Operating Characteristics

A preliminary design for SWM Facility 1 and 2 has been completed using ADS StormTech Design Tool to demonstrate that the SWM tanks are adequately sized for stormwater management requirements. Preliminary operating profiles of the SWM Facilities are presented in **Table 11**.

Table 11: SWM Facility 1 and 2 Operating Characteristics

Component	Elevation (m)	Storage Provided (m^3)	Storage Required (m^3)
SWM Facility 1 (North Tank)			
Bottom of Tank	205.00	-	
Top of Tank	206.68	682	435
SWM Facility 2 (South Tank)			
Bottom of Tank	220.10	-	
Top of Tank	221.78	979	780

As evident by **Table 11,** the SWM Facilities are sufficiently sized to provide the required stormwater management controls. Permits and other regulatory instruments such as an Environmental Compliance Approval (MECP) and Fill Permit (HCA/NEC) will be secured at the detailed design stage. Refer to **Appendix H** for the supporting calculations for SWM Facility.

The ADS StormTech Design Tool was used for the preliminary design of the underground stormwater management tanks, shown in **Appendix H,** as part of this application. However, alternative underground stormwater management tanks, including Cupolex, StormCon, Triton, etc., may be investigated during the detailed design process.

8.6 External Drainage Management

As noted in previous sections, 10.73 ha of external drainage enters the site, 2.99 ha of which drains to the east, and 7.74 ha drains to the north. The proposed stormwater management strategy for the Subject Development will convey the 7.74 ha that drains north around the development area into the existing large pond, and the 2.99 ha that drains east through SWM Facility 2 into the existing

wetland to match pre-development conditions. It is understood that in order to receive external flows into SWM Facility 2, techniques such as swales with curb-cuts or catchbasin leads designed to convey the 100-year storm will be used. The evaluation of these techniques will be conducted in future design stages.

9.0 Preliminary Low Impact Development Strategy

Based on the proposed Concept Plan, several opportunities exist to implement Low Impact Development (LID) techniques to achieve the stormwater management objectives for the Subject Development. Detailed design of LIDs will be completed during future technical submissions, however, a preliminary analysis of LIDs that can be considered for the Subject Development are (but not limited to) bioretention swales, enhanced grass swales, infiltration trenches/soakaway pits, downspout disconnection, and open-bottom stormwater management tanks. LID/infiltration measures should be designed to ensure a minimum separation between the seasonal high groundwater level and the bottom of the LID feature.

The preliminary LID strategy for the Subject Development will aim to maximize infiltration of clean water from rooftops and lawns using LIDs located within open spaces near residential buildings, private SWM facilities, and adjacent to but located outside of the Natural System.

10.0 UTILITIES

The Subject Development will be serviced with natural gas, telephone, cable TV, and hydro. The design of such utilities will be coordinated with the local utility companies servicing the City. Utilities are proposed to follow the alignment of the internal road network, with individual service connections to each lot.

11.0 EROSION AND SEDIMENT CONTROLS

Sediment and erosion controls (ESC) will be installed prior to the commencement of any earthworks and maintained throughout until the site is stabilized or as directed by the Engineer, HCA, and/or City. Controls are to be inspected regularly, after each significant rainfall, and maintained in proper working condition.

Proposed ESC measures include heavy duty silt fence around the perimeter of the development limit, interceptor swales and ditches, flow check dams, dust suppression, temporary silt traps, and topsoil stripping/protection. **Figure 7** shows the Erosion and Sediment Control Plan which will be further refined during future technical design submissions.

12.0 CONCLUSION AND RECOMMENDATIONS

Based on the foregoing we conclude that the proposed development can be adequately serviced.

1. Road access to the Subject Development will be provided by one (1) connection to Sulphur Springs Road with an emergency access, coupled with a paved shoulder and/or mountable curb for emergency access throughout the site where the access converges. Internal roads will be private condominium laneways with building-to-building face spacing of 20.5 m.

2. Preliminary site grading has been completed to demonstrate that overland flow routes to the proposed SWM Facilities are feasible and that grading is contained within the development limits.

3. The development will be serviced by an internal gravity sewer system that will convey wastewater flows through the internal road network alignment to a proposed private sewage pumping station at the low point in the development. The SPS will pump flows through a forcemain to a transition manhole at the development limit eventually connection by gravity to the existing sanitary sewer on Sulphur Springs Road. Alternative options were discussed as contingencies for future design should recommended analyses and investigations determine the recommended servicing strategy is not feasible.

4. The development will be serviced with drinking water through private watermain internal to the site following the proposed road alignment complete with all valving, appurtenances, and hydrants in conformance with City Standards to provide potable water and fire flow. A connection will be made to a water meter chamber at the limit of the development which will feed into the existing watermain on Sulphur Springs Road. Preliminary WaterCAD modelling was completed with the City's boundary condition information to confirm viability of sizing, configuration, and demand flow scenarios in the development.

5. External watermain upgrades are proposed on Sulphur Springs Road to extend the existing watermain east for added redundancy and efficiency in the system for the proposed connection to the Subject Development.

6. Two (2) underground stormwater management facilities are proposed to meet the stormwater management quantity criteria. The north facility will outlet to an existing pond within the Subject Lands, while the south facility will outlet east to private property maintaining pre-development drainage patterns to an existing wetland.

7. Water quality control to an 'enhanced' level of protection will be provided by two (2) OGS units in a treatment train approach with the proposed SWM Facilities.

8. A perimeter network of utilities with the possibility of extension into the Subject Development exists.

9. Erosion and sediment controls will be implemented prior to the commencement of construction activities and will be maintained and inspected regularly throughout the duration of the proposed development. Controls proposed included temporary silt traps, interceptor swales, filter check dams, silt fencing, and a mud mat entrance.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

David Wilcox, P. Eng.
Senior Project Manager

C.F. CROZIER & ASSOCIATES INC.

John Willsey, EIT, MBA
Engineering Intern, Land Development

JW

J:\2700\2736 - Mizrahi Developments co Dentons Canada LLP\7210 - Ancaster Townhouse Development\Reports\1st Submission\FSSWMR\2024.11.20_7210 Ancaster Sulphur Springs FSSWM Report.docx

APPENDIX A

Topographic Survey (Barich Grenkie Surveying Ltd., April 28, 2022)

METRIC
DISTANCES SHOWN ON THIS PLAN ARE IN METERS
AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

ELEVATION NOTE
ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD–1928:1978) AND ARE DERIVED FROM CITY OF RICHMOND HILL BENCHMARK No. 247.470 HAVING AN ELEVATION OF 95014 m.
ELEVATION DEPICTED ON THE FACE OF THIS PLAN ARE FOR DESIGNING PURPOSES ONLY.

BEARING NOTE
BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF SULPHUR SPRINGS ROAD AS SHOWN ON PLAN 62R–21111 HAVING A BEARING OF N73°45'35"W.

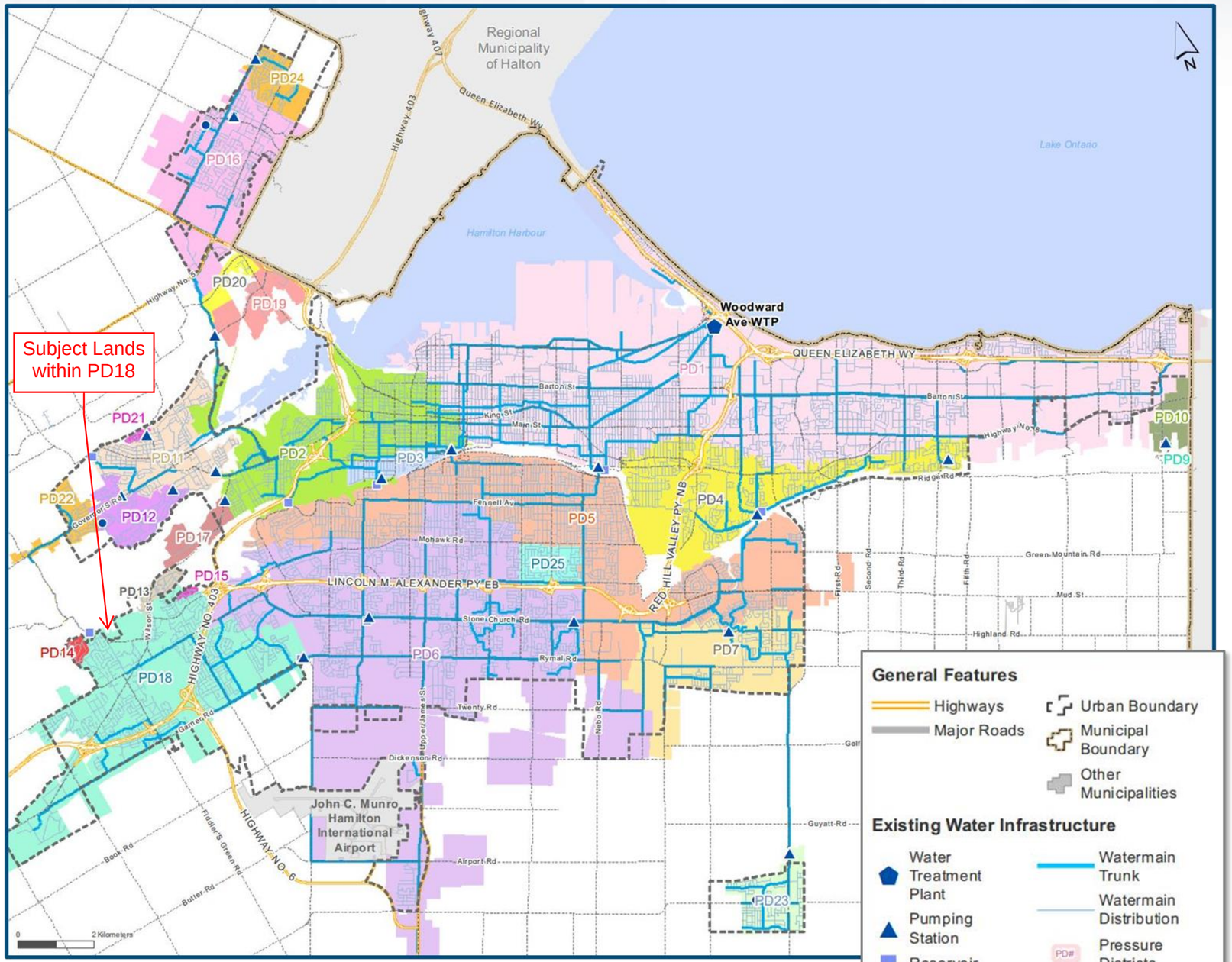
LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
PK	DENOTES	SURVEYORS NAIL SET IN WASHER
OU	DENOTES	ORIGIN UNKNOWN
CC	DENOTES	CUT CROSS
WIT	DENOTES	WITNESS
CLF	DENOTES	CHAIN LINK FENCE
BF	DENOTES	BOARD FENCE
IF	DENOTES	IRON FENCE
RP	DENOTES	REGISTERED PLAN 2299
P1	DENOTES	PLAN 65R–13166
P2	DENOTES	PLAN 65R–13627
P3	DENOTES	PLAN 65R–19561
P4	DENOTES	PLAN 62R–8122
P5	DENOTES	PLAN 62R–21111
P6	DENOTES	PLAN 62R–7529
P7	DENOTES	PLAN 62R–6653
665	DENOTES	THOMAS W. KELLY., O.L.S.
921	DENOTES	P. SALNA, O.L.S.
MMP	DENOTES	MACKAY MACKAY & PETERS., O.L.S.
1497	DENOTES	ASHENHURST NEUWENS LTD., O.L.S.
1213	DENOTES	JOHN D. PETERS., O.L.S.
D1	DENOTES	INSTRUMENT No. VM155603

APPENDIX B

Master Planning Excerpts (City of Hamilton, 2023)

Existing Water System



Treatment

- Water is drawn from Lake Ontario and is treated at the Woodward Ave Water Treatment Plant

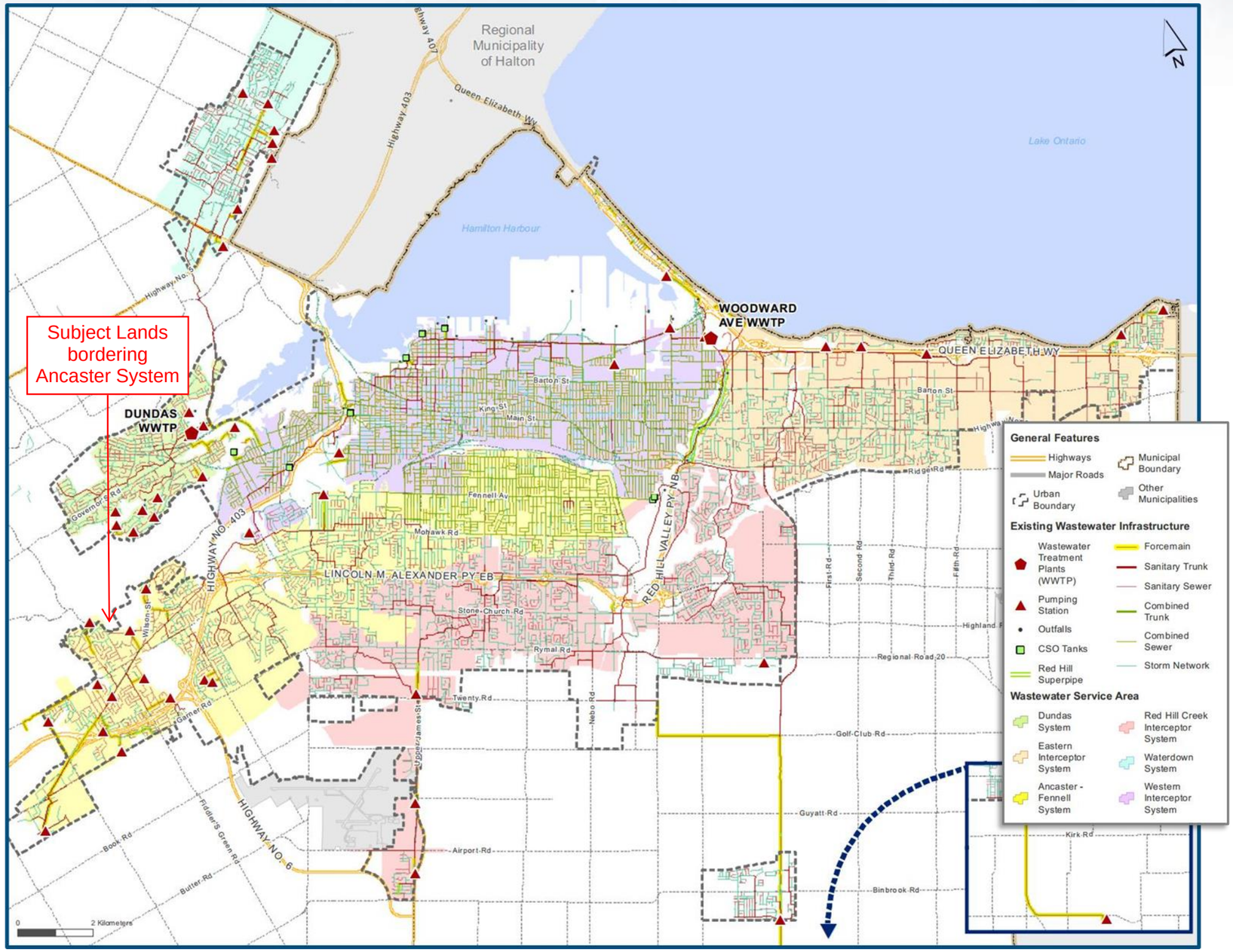
Pumping & Transmission

- Treated potable water is pumped from the Treatment Plant through a network of large diameter feedermains throughout the City
- The City is divided up into several areas called Pressure Districts, based on topography.
- Water is pumped by pumping stations located throughout the City which provide suitable pressure for use for each Pressure District

Storage

- Water is stored at a series of in-ground reservoirs and above ground elevated tanks, which provide storage for fire, emergency use and more efficient system operation

Existing Wastewater System



- The City of Hamilton is divided up into two major sewer servicing areas:
  - **Combined** – located generally in the older areas of the City, where stormwater and wastewater from homes and businesses flow through a common "Combined" sewer
  - **Separated** – located generally in the outer former municipalities, where wastewater and stormwater are conveyed by two different "Separated" sewers.

Treatment and Conveyance

- Sewers convey flow that ultimately outlets to one of two Wastewater Treatment Plants (WWTP); Dundas WWTP and Woodward WWTP where the wastewater is treated, then treated effluent is discharged to Desjardins Canal and Hamilton Harbour, respectively.

Sewage Pumping Stations

- Sewage Pumping Stations are located throughout the City to pump flow from areas that are not serviceable purely by gravity sewers

Combined Sewer Overflows (CSOs)

- Several Combined Sewer Overflow (CSO) tanks and outlets are located within the City to protect against sewer surcharging during severe wet weather events (https://www.hamilton.ca/city-initiatives/our-harbour/combined-sewer-overflow-storage-strategy)

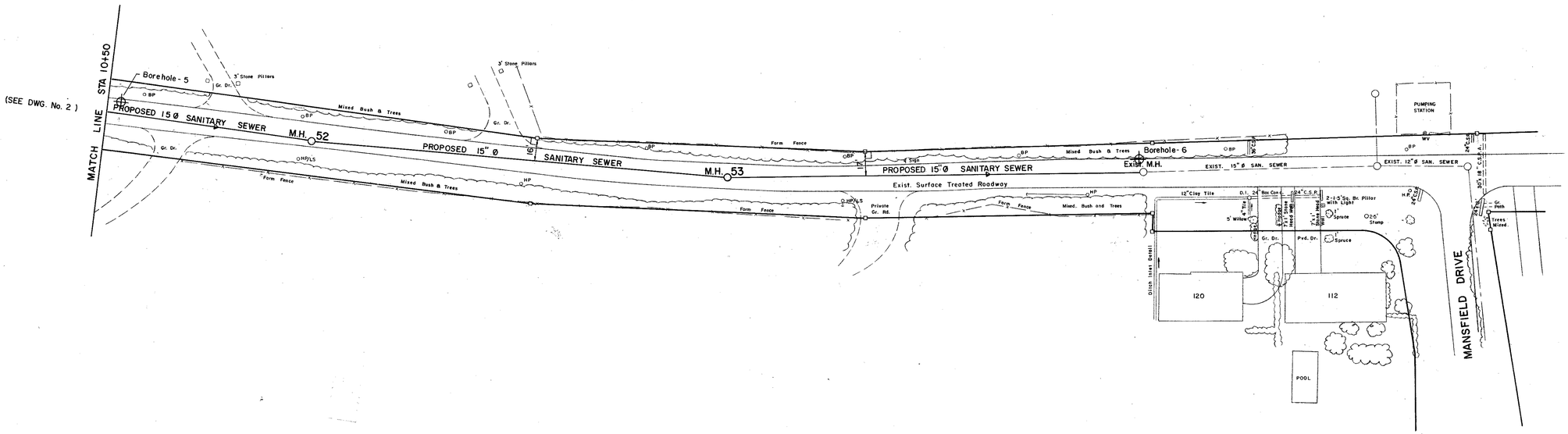
APPENDIX C

As-Constructed Drawings (City of Hamilton)

Sulphur Springs Rd

1.

Sewers

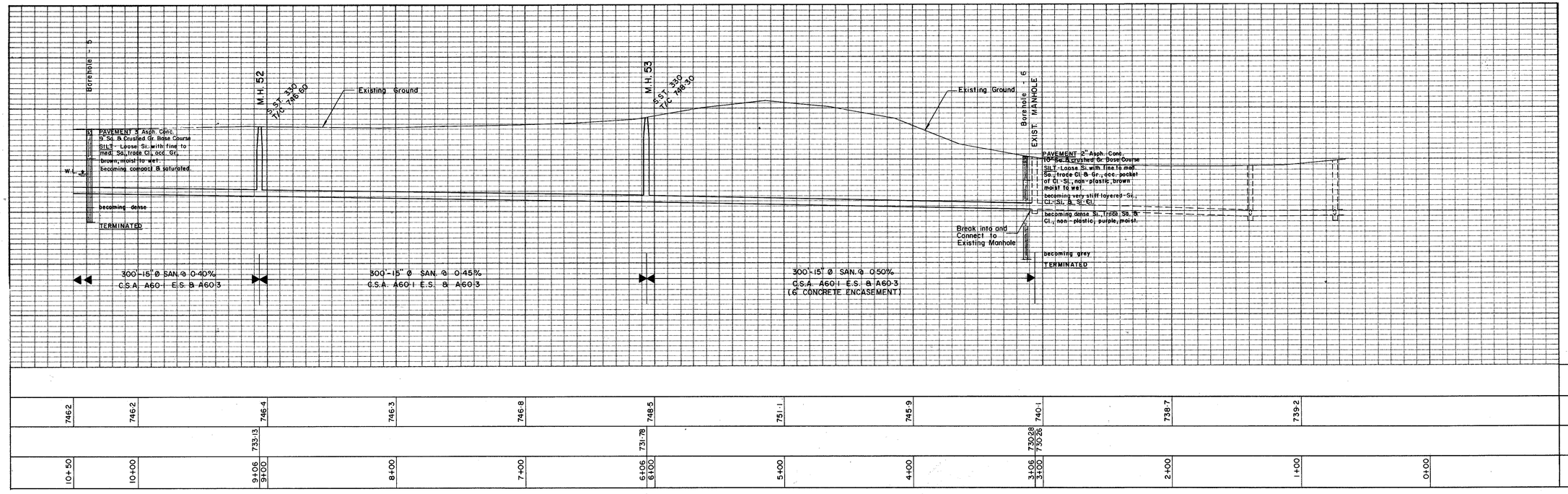


NOTE:

SEE DWG. No. 5 FOR GENERAL NOTES AND DETAILS.

GBM 75-U-236 EL 668.097'
TABLET IN SOUTH CONCRETE FOUNDATION 6.9' EAST OF DOORWAY AND 0.5' BELOW BRICKWORK, ANCASTER P.U.C. PUMPING STATION NORTH SIDE SULPHUR SPRINGS ROAD 0.5 MILE SOUTH EAST OF MINERAL SPRINGS ROAD.

SULPHUR SPRINGS ROAD



746.2	746.2		746.4	746.3	746.8	748.5	751.1	745.9	740.1	738.7	739.2		Ground Profile Elevations
		733.13				731.78			730.28 / 730.26				Sanitary Sewer Inverts
10+50	10+00		9+06 / 9+00	8+00	7+00	6+06 / 6+00	5+00	4+00	3+06 / 3+00	2+00	1+00	0+00	Chainage

No.	REVISION	DATE	INITIAL
1	Borehole Data Added	Sept.25,79	W. M.

SCALE:
0' 5' 10'
VERTICAL
0' 20' 40'
HORIZONTAL

W. J. McSHANE
CONSULTING ENGINEER

REGISTERED PROFESSIONAL ENGINEER
W. J. McSHANE
PROVINCE OF ONTARIO

APPROVED
COMMISSIONER OF ENGINEERING

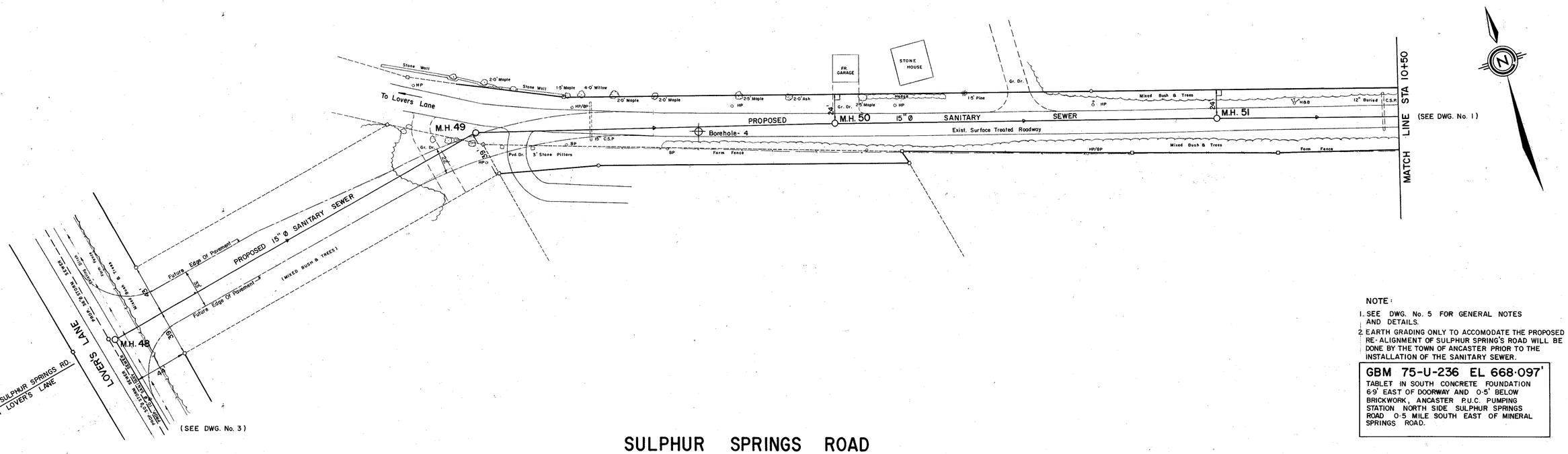
THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
DEPARTMENT OF ENGINEERING
SULPHUR SPRINGS ROAD
SANITARY SEWER INSTALLATION

C.C.PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS — HAMILTON

DESIGN	K.L.	DRAWN	A.J.F.	CHECKED	W.J. McS.
ACCOUNT No.				PROJECT No.	4099
DATE:	JULY 1979			DRAWING No.	1

84 S 66

2. Sulphur Springs Rd

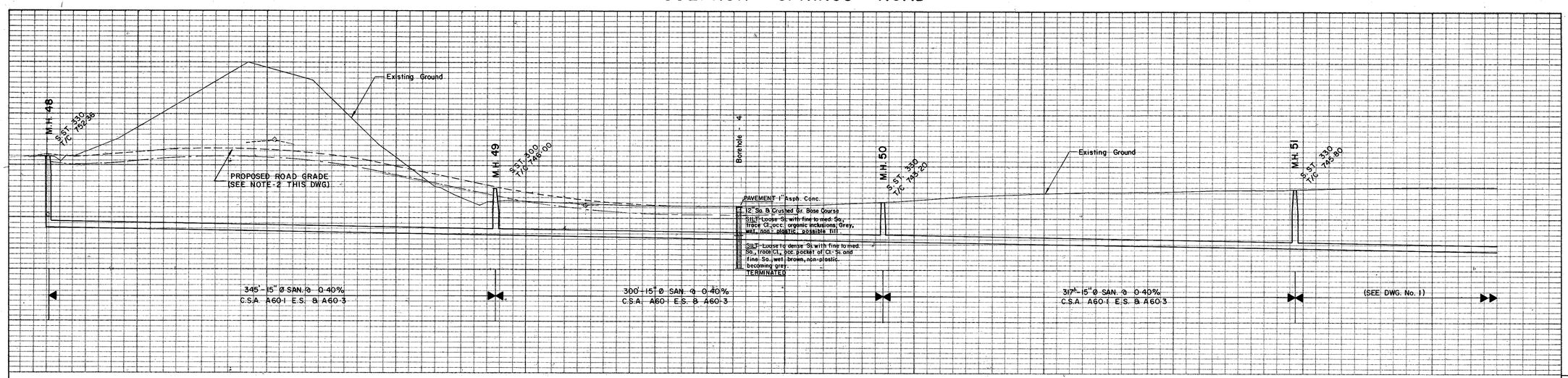


NOTE:

1. SEE DWG. No. 5 FOR GENERAL NOTES AND DETAILS.
2. EARTH GRADING ONLY TO ACCOMODATE THE PROPOSED RE-ALIGNMENT OF SULPHUR SPRING'S ROAD WILL BE DONE BY THE TOWN OF ANCASTER PRIOR TO THE INSTALLATION OF THE SANITARY SEWER.

GBM 75-U-236 EL 668.097'
TABLET IN SOUTH CONCRETE FOUNDATION 6.9' EAST OF DOORWAY AND 0.5' BELOW BRICKWORK, ANCASTER P.U.C. PUMPING STATION NORTH SIDE SULPHUR SPRINGS ROAD 0.5 MILE SOUTH EAST OF MINERAL SPRINGS ROAD.

SULPHUR SPRINGS ROAD



Ground Profile Elevations	757.4		769.0		751.9		743.2	742.4	742.5	743.6	744.9	745.3	746.1	746.2	746.2							
Sanitary Sewer Inverts	740.28S 738.18E						736.80			735.60			734.33									
Chainage	21+68	21+00		20+00		19+00	18+23	18+00	17+00	16+00	15+23	15+00	14+00	13+00	12+06	12+00	11+00		10+50			

REVISION	DATE	INITIAL
Proposed Road Grade & Borehole Data Added	Sept. 25, 79	W. M.

SCALE:
0' 5' 10'
VERTICAL
0' 20' 40'
HORIZONTAL

W. J. McSHANE
CONSULTING ENGINEER

REGISTERED PROFESSIONAL ENGINEER
W. J. McSHANE
PROVINCE OF ONTARIO

APPROVED
COMMISSIONER OF ENGINEERING

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
DEPARTMENT OF ENGINEERING

SULPHUR SPRINGS ROAD
SANITARY SEWER INSTALLATION

C.C.PARKER & ASSOCIATES LTD.
CONSULTING ENGINEERS — HAMILTON

DESIGN K.L.	DRAWN A.J.F.	CHECKED W.J. McS.
ACCOUNT No.	PROJECT No. 4099	
DATE: JULY 1979	DRAWING No. 2	

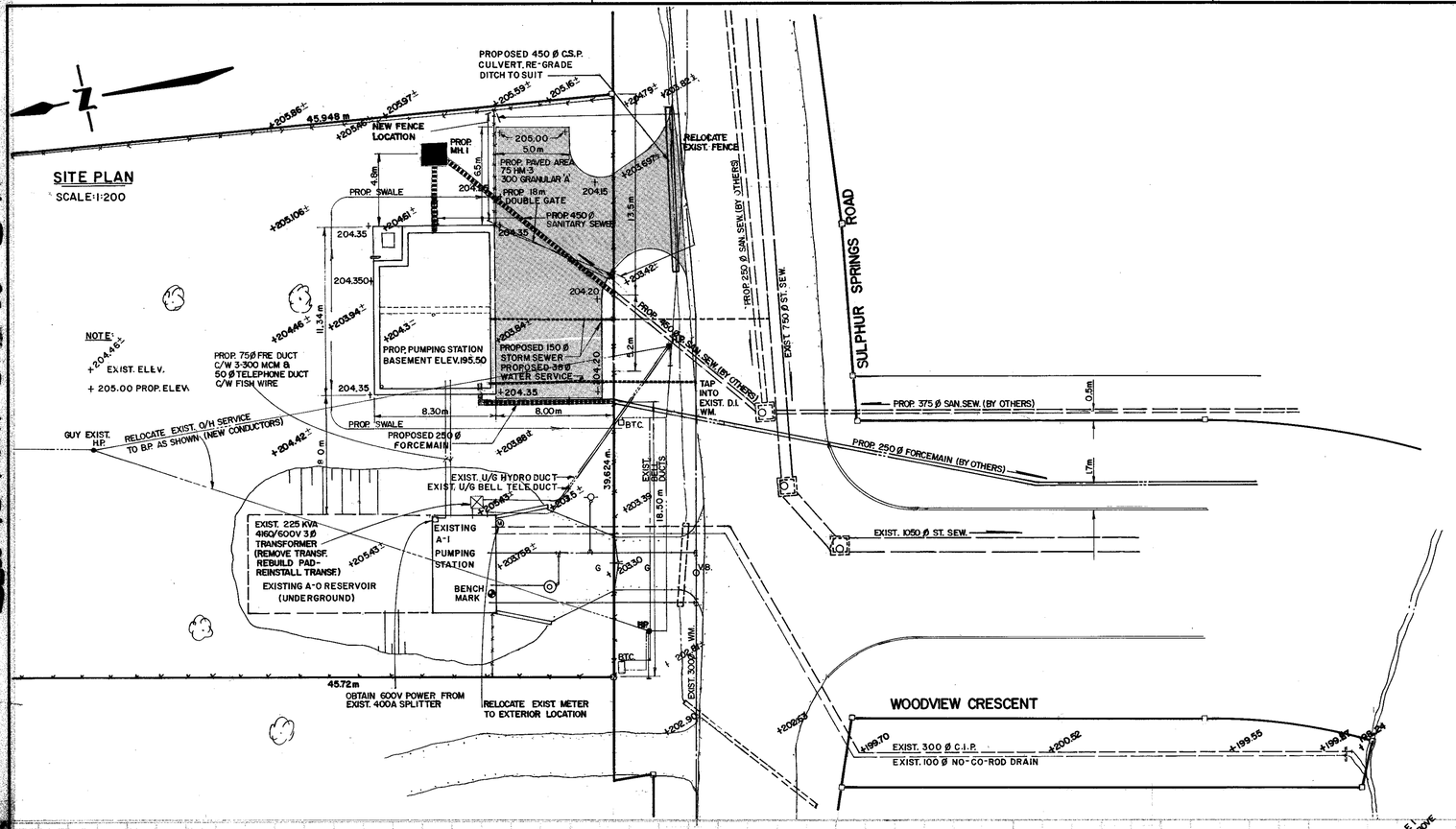
84 S 66

Sewage Pump Station SH-12

1. S-87-58

SITE PLAN

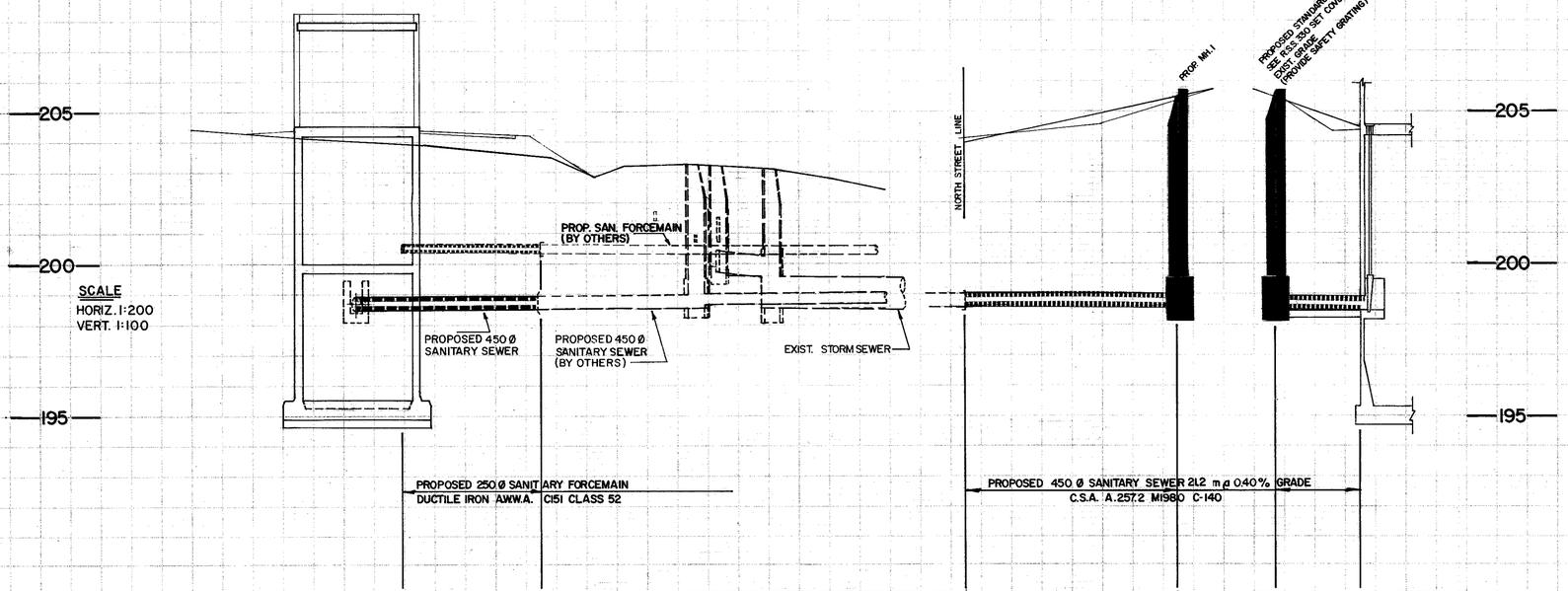
SCALE: 1:200



GENERAL NOTES

1. Concrete protective cover for reinforcement shall be 50 mm except where noted otherwise.
2. All recesses in walls and slabs to be 40 mm except where shown otherwise.
3. All exposed edges of concrete beams, columns and wall openings to have 20 mm champhers or as otherwise shown on the drawings as directed.
4. All pipes and castings through walls and slabs to be cast-in-place, except where shown otherwise.
5. Opening frames and wall thimbles in reinforced concrete walls shall be cast-in-place.
6. For floor drains, opening frames, handrailing, motor and pump bases, pipe and pipe supports not shown on structural drawings see mechanical drawings.
7. For unreinforced concrete curbs and roof fill, floor and roof drains, loose lintels and masonry anchorages, floor finishes, door and window frames see architectural drawings.
8. For sizes and location of electrical conduits and openings for cables see electrical drawings.
9. Roof slopes to be made of 10 mm 25 Mpa concrete with finish for PVC membrane (or GRM).
10. All inserts shall be Richmond structural concrete inserts, type EC-2FW for M20 bolts, with plastic setting plugs, unless noted on the drawings. All inserts shall be electro galvanized.
11. All elevations refer to structural concrete except as noted otherwise.
12. Continuously protect the bottom of the excavation and all slabs and foundations on ground from damage due to frost and ground water pressures.
13. Dewater the excavation and maintain stability of the bottom and sides of the excavation during and after excavating so that all concrete, pipes, etc. can be placed in the dry.
14. All foundations and slabs on ground to be on 75 mm concrete mudmat on sound undisturbed soil. Place mudmat immediately after final grade is reached and has been made acceptable.
15. Where "to suit" is shown the dimension shall be determined in the field from equipment shop drawings.

PLAN N° 87-S-58 SHT. 1



200.375	200.375	198.552	198.490	198.469	198.490	198.469	198.450	PROPOSED SANITARY SEWER INVERT ELEVATIONS
0+00	0+10	0+21.2	0+48		0+48		0+100	PROPOSED SEWER CHAINAGES

No.	REVISIONS	DATE	INITIAL

NOTES: GEODETIC BENCH MARK Nº 75-U-236 ELEV. 203.532 (1978 ADJUSTMENT)

METRIC NOTE
DISTANCES SHOWN ON THIS PLAN ARE IN METRES UNLESS OTHERWISE NOTED.

SCALES AS NOTED

APPROVED

DIRECTOR | COMMISSIONER OF ENGINEERING

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
DEPARTMENT OF ENGINEERING

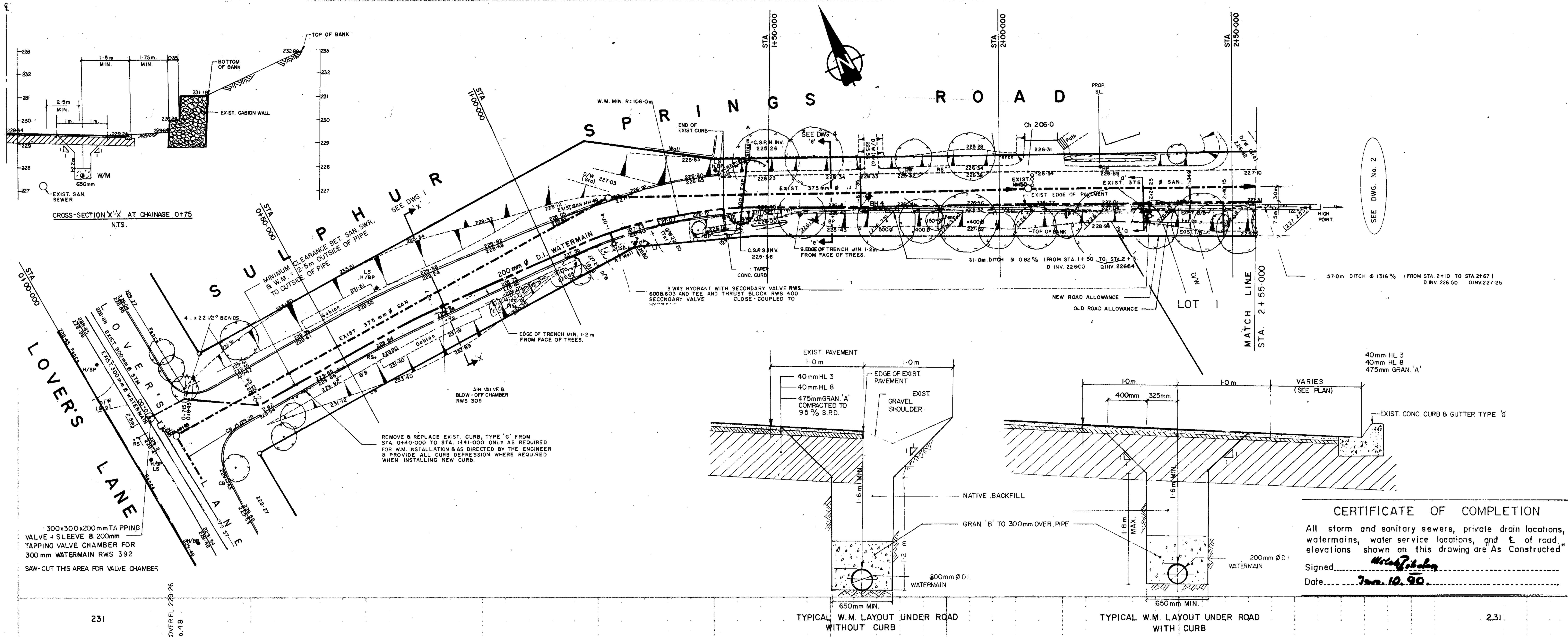
DATE: 87-10-05

PROJECT No. S704-25

SEWAGE PUMPING STATION SH-12
SULPHUR SPRINGS ROAD
SITE PLAN & LOT GRADING

DRAWING No. 87-S-58 | REV. O | SHEET 1 OF

87 S 58



KEY PLAN
N.T.S.

CERTIFICATE OF COMPLETION

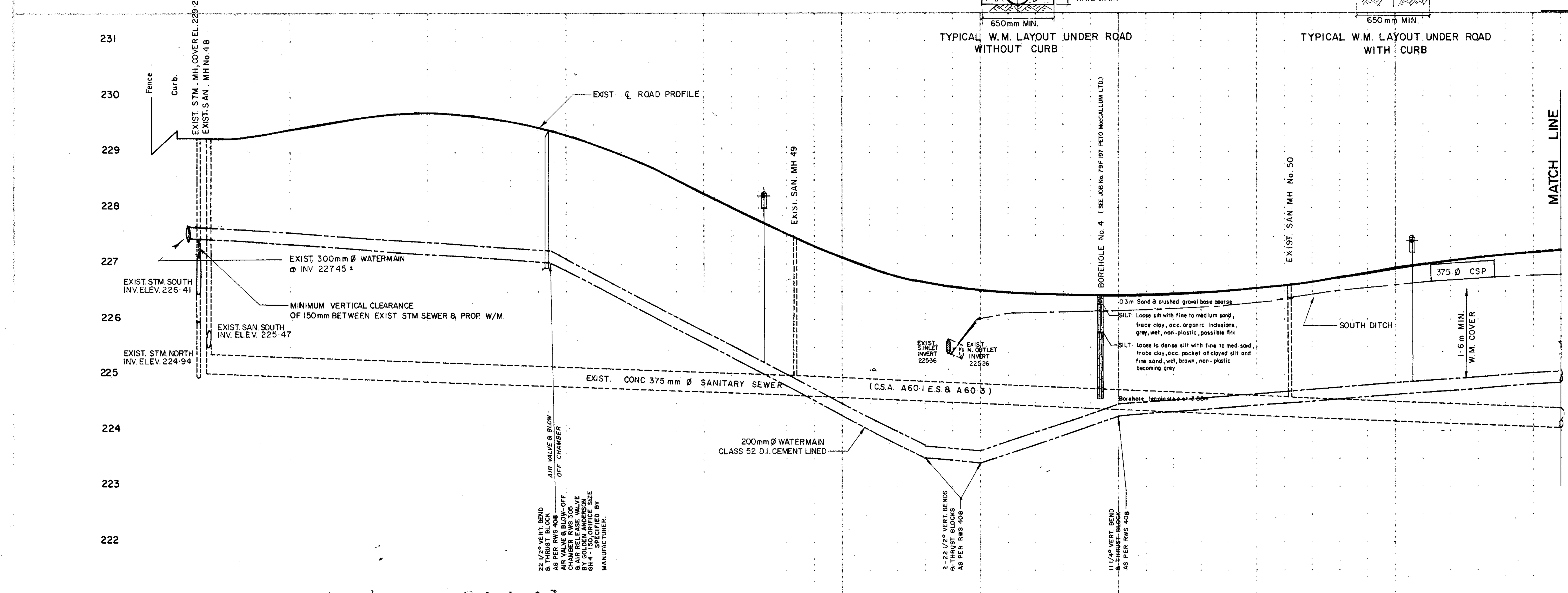
All storm and sanitary sewers, private drain locations, watermains, water service locations, and ℄ of road elevations shown on this drawing are "As Constructed"

Signed: [signature]

Date: Jan. 10. 90.

GENERAL NOTES

1. WATERMAIN BEDDING (RWS 500 SHEET 2).
2. ALL WATERMAIN PIPE SHALL BE D.I. CLASS 52 CEMENT LINED, TYTON JOINTS.
3. MINIMUM 1.6M COVER REQUIRED FOR WATERMAINS AND WATER SERVICES.
4. WATER SERVICE PIPE 25 MM TYPE 'K' SOFT COPPER BEDDING AS PER RWS-500.
5. 2.5M CLEARANCE (OUTSIDE WALLS) REQUIRED BETWEEN PRIVATE SEWERS AND WATER SERVICES.
6. THE POSITION OF POLE LINES, CONDUITS, SEWERS, MANHOLES, CATCHBASINS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
7. RESTORE OF BLVD. AREA AND REGRADE DITCH WITHIN ROAD ALLOWANCE SEE DWG. NO. 3 AND TOWN OF ANCASTER STD. 2.
8. THE CONTRACTOR SHALL CUT THOSE LIMBS OF EXISTING TREES THAT PROJECT OVER THE AREA OF TRENCH ON SOUTH SIDE OF SULPHUR SPRINGS ROAD NEATLY AND BRACCOED ALL TREES BEFORE BEGINNING ANY TRENCH WORK AS DIRECTED BY TOWN ENGINEER.
9. ALL REINSTATEMENTS TO BE COMPACTED TO 95% S.P.D.
10. STEEP BANKS ARE NOT TO BE DISTURBED.
11. SILT PROTECTION MUST BE PROVIDED AT EXIST. C.S.P. OUTLETS TO THE SATISFACTION OF THE TOWN.
    MAX. SPACING OF 'T' POSTS - 2.4M.
    FILTER FABRIC - TERRAFIX 270R OR EQUAL TO BE FASTENED TO SNOW FENCE.
    BOTTOM 0.3M OF FABRIC TO BE BURIED.
    FENCE TO BE MIN. 5.0M RADIUS.



CHAINAGES ALONG ℄ OF EXISTING SANITARY SEWER	EXISTING ROAD ELEV'S ABOVE EXIST. SAN. SEWER	
0+00.000	228.98	
0+10.200	229.24	225.02
0+15.000	229.25	
0+30.000	229.48	
0+45.000	229.75	
0+60.000	229.66	
0+75.000	229.34	
0+90.000	228.77	
1+05.000	228.03	
1+16.000	227.47	224.60
1+20.000	227.28	
1+35.000	226.75	
1+50.000	226.47	
1+65.000	226.40	
1+80.000	226.44	
1+95.000	226.47	
2+06.000	226.59	224.21
2+10.000	226.61	
2+25.000	226.91	
2+40.000	227.10	
2+55.000	227.22	

WATERMAIN INVERT ELEVATIONS: 227.45 ± TO MATCH EXIST. W.M. | 227.00 ± | 200mm Ø WATERMAIN CLASS 52 D.I. CEMENT LINED | 223.50 ± | 223.40 ± | 224.25 ± | 224.85 ±

GIBSON SITE PLAN
PROJECT No. 86001

SULPHUR SPRINGS ROAD
WATERMAIN INSTALLATION

1	AS BUILT ... SPV	30/9/87	
No.	Revision	Date	App'd

June 1/87

[signature] June 1/87

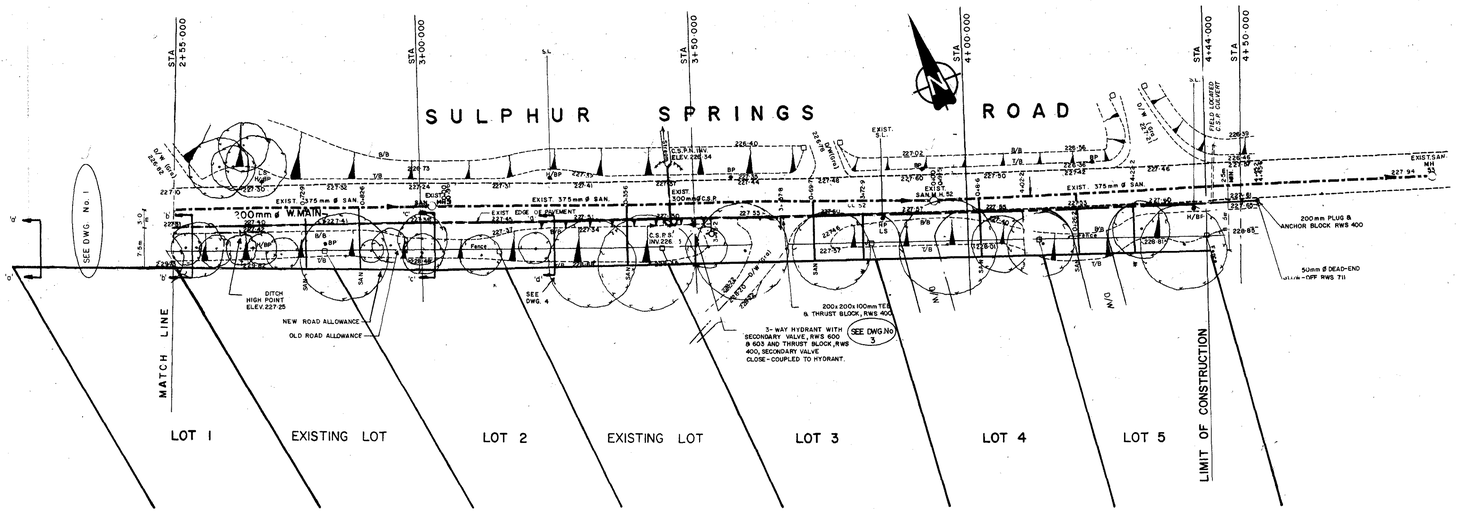
TOWN OF ANCASTER

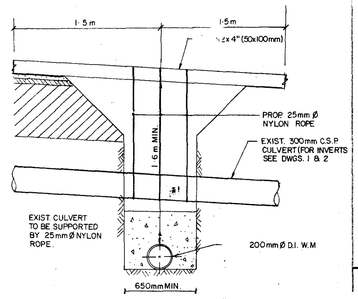
T. HO.
S.P.V, E.E.M.
L. SEARS

THE FIRE HYDRANT 45.72m NORTH OF LOYMINN & LOVERS LANE ON TOP OF BOLT CLOSEST TO CURB ON TOP FLANGE ELEVATION 230.843

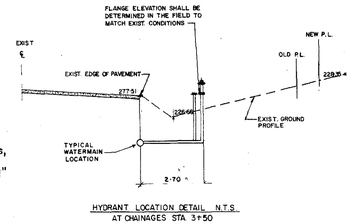
MARCH 1987 | 1-500 | 1-50 | Dwg No 1

87W23

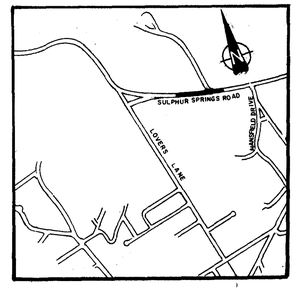




TEMPORARY PROTECTION FOR EXIST. 300mm C.S.P CULVERT DURING WATERMAIN INSTALLATION
N.T.S.



HYDRANT LOCATION DETAIL N.T.S.
AT CHAINAGES STA 3+50



KEY PLAN
N.T.S.

GENERAL NOTES

1. WATERMAIN BEDDING (RWS 500 SHEET 2).
2. ALL WATERMAIN PIPE SHALL BE D.I. CLASS 52 CEMENT LINED, TYTON JOINTS.
3. MINIMUM 1.6M COVER REQUIRED FOR WATERMAINS AND WATER SERVICES.
4. WATER SERVICE PIPE 25 MM TYPE 'K' SOFT COPPER BEDDING AS PER RWS-500.
5. 2.5M CLEARANCE (OUTSIDE WALLS) REQUIRED BETWEEN PRIVATE SEWERS AND WATER SERVICES.
6. THE POSITION OF POLE LINES, CONDUITS, SEWERS, MANHOLES, CATCHBASINS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
7. RESTORE BLVD. AREA AND REGRADE DITCH WITHIN ROAD ALLOWANCE SEE DWG. NO. 3 AND TOWN OF ANCASTER STD. 2.
8. THE CONTRACTOR SHALL CUT THOSE LIMBS OF EXISTING TREES THAT PROJECT OVER THE AREA OF TRENCH ON SOUTH SIDE OF SULPHUR SPRINGS ROAD NEATLY AND BRACCOED ALL TREES BEFORE BEGINNING ANY TRENCH WORK AS DIRECTED BY TOWN ENGINEER.
9. ALL REINSTATEMENTS TO BE COMPACTED TO 95% S.P.D.
10. STEEP BANKS ARE NOT TO BE DISTURBED.
11. SILT PROTECTION MUST BE PROVIDED AT EXIST C.S.P. OUTLETS TO THE SATISFACTION OF THE TOWN.
    MAX. SPACING OF 'T' POSTS - 2.4M.
    FILTER FABRIC - TERRAFIX 270R OR EQUAL TO BE FASTENED TO SNOW FENCE.
    BOTTOM 0.3M OF FABRIC TO BE BURIED.
    FENCE TO BE MIN. 3.0M RADIUS.

CERTIFICATE OF COMPLETION

All storm and sanitary sewers, private drain locations, watermains, water service locations, and ℄ of road elevations shown on this drawing are As Constructed"

Signed: Anthony Gibson

Date: Jan 10. 90.

CHAINAGES ALONG ℄ OF EXISTING SANITARY SEWER	2+55.000	2+70.000	2+85.000	3+00.000	3+02.000	3+15.000	3+30.000	3+45.000	3+60.000	3+75.000	3+90.000	3+93.500	4+05.000	4+20.000	4+35.000	4+50.000	4+65.000	4+80.000	4+84.500
EXISTING ROAD ELEV'S ABOVE EXIST. SAN. SEWER	227.22	227.33	227.32	227.38	227.43	227.40	227.45	227.51	227.50	227.55	227.60	227.61	227.55	227.52	227.57	227.64	227.74	227.94	228.06
EXIST. SAN. MH ELEVATIONS				223.88								223.50						223.06	
PROP. SAN. MH ELEVATIONS																			
WATERMAIN INVERT ELEVATIONS	224.85±				224.80±	200mm ø WATERMAIN CLASS 52 D.I. CEMENT LINED						225.35±							

CHAINAGES ALONG ℄ OF EXISTING SANITARY SEWER
EXISTING ROAD ELEVATIONS ABOVE EXIST. SAN. SEWER
EXIST. SAN. MH ELEVATIONS
PROP. SAN. MH ELEVATIONS
WATERMAIN INVERT ELEVATIONS

GIBSON SITE PLAN
PROJECT No. 86001

SULPHUR SPRINGS ROAD
WATERMAIN INSTALLATION

1. AS BUILT ... 3 ... 21 ... 3/9/87

June 1/87

TOWN OF ANCASTER

WILLIAM L. SEARS AND ASSOCIATES LIMITED
CONSULTING PROFESSIONAL ENGINEERS
STONEY CREEK, ONTARIO

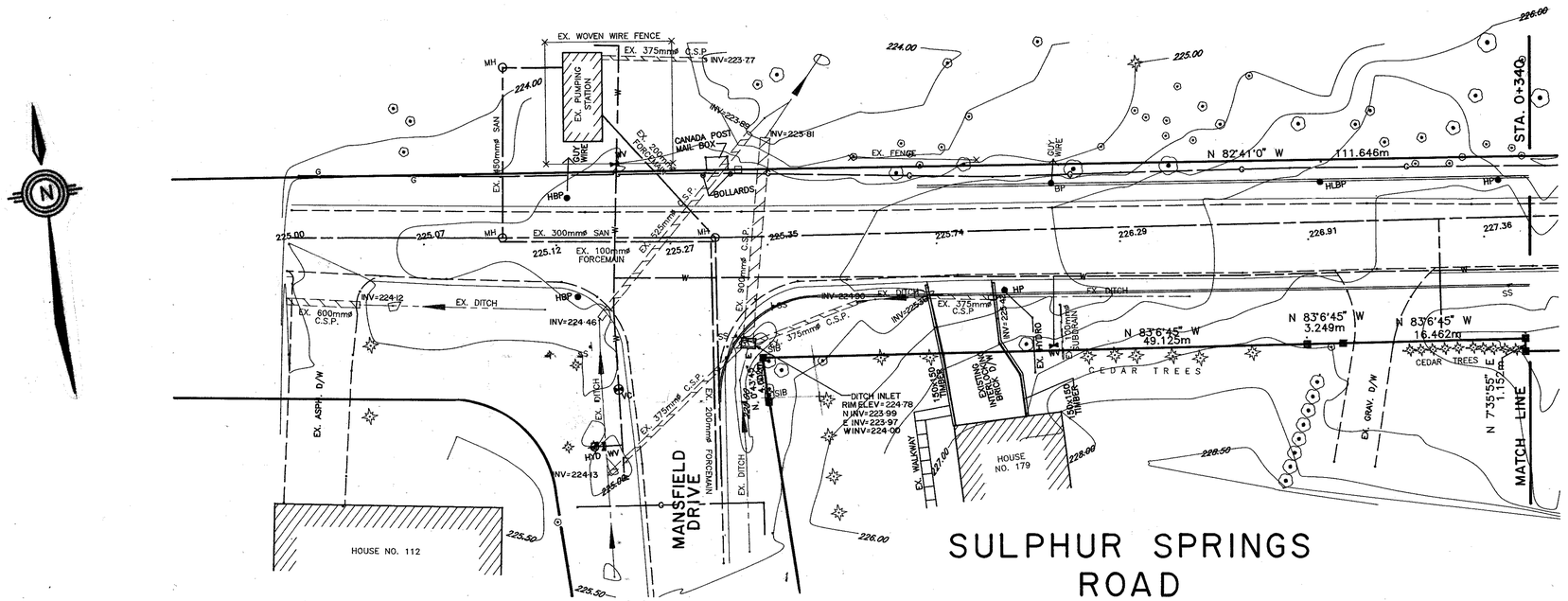
T. HO
S.P.V. E.I.E.M.
L. SEARS

Bench Mark
THE FIRE HYDRANT 45·72m NORTH OF LOVERS LANE ℄ LOVERS LANE ON TOP OF BOLT CLOSEST TO CURB ON TOP FLANGE
ELEVATION 230·843

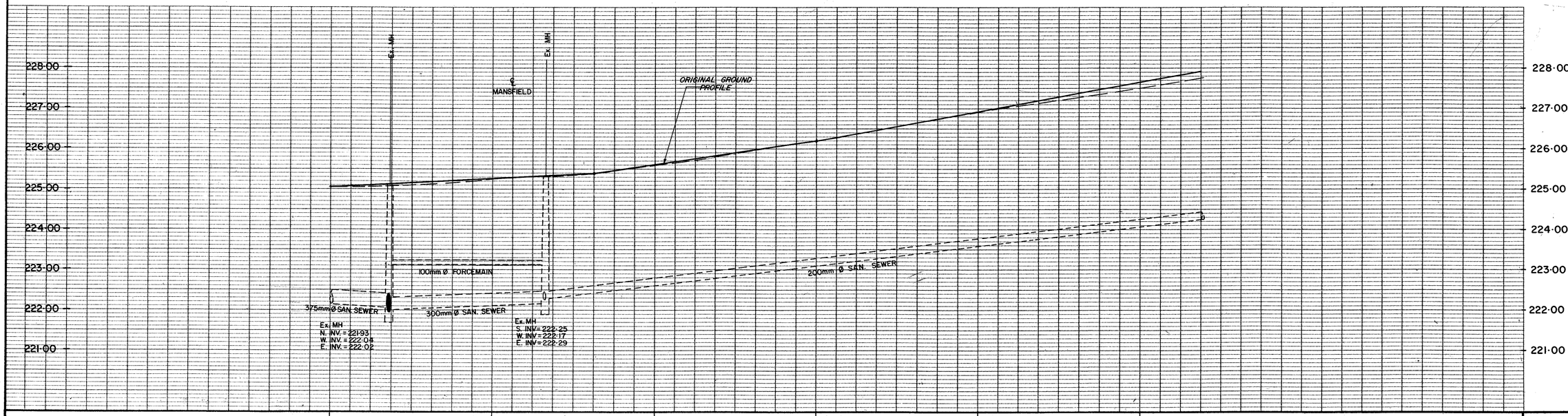
Approved by
Date MARCH 1987
Scale Horiz. 1-500 Vert. 1-50
Dwg No 2

87023

175D



SULPHUR SPRINGS ROAD



225.07	225.24	225.58	226.19	226.91	227.51		EXISTING ℄ ROAD
							STORM SEWER INVERT ELEV.
0+440	0+420	0+400	0+380	0+360	0+340		CHAINAGE

GENERAL NOTES

1. **CONTRACTOR SHALL VERIFY LOCATIONS AND INVERTS OF ALL EXISTING SANITARY AND STORM SEWERS AND WATERMAINS, PRIVATE SEWER DRAINS AND WATER SERVICES, GASMAINS, CABLE TV, HYDRO AND TELEPHONE DUCTS, ETC., AT START OF CONSTRUCTION.**

NO	REVISION	BY	DATE

ENGINEER

TOWN OF ANCASTER
Engineering Department

DESIGN:
DRAWN: R.E.M.
SCALE: HOR. 1:250m
VERT. 1:50m
DATE:
DWG: PP 4-4

GENERAL NOTES:

STORM SEWER

CONSTRUCTION OF STORM SEWERS SHALL BE IN ACCORDANCE WITH MOEE, ONTARIO PROVINCIAL AND TOWN OF ANCASTER STANDARD SPECIFICATIONS.

STORM SEWERS TO BE INSTALLED WITH CLASS 'B' GRANULAR 'A' CRUSHED LIMESTONE BEDDING AND 0.3m GRANULAR CRUSHED LIMESTONE COVER AS PER OPSD 802.303.

CATCHBASIN LEADS TO BE 200mmø PVC SDR 35.

STORM SEWERS SHALL BE CSA A257.2-M1982 65-D TYPE 50 CEMENT, RUBBER GASKET JOINT.

ALL STORM SEWER PIPE IS TO BE FROM PLANTS APPROVED BY THE PREQUALIFICATION PROGRAM.

UTILITIES

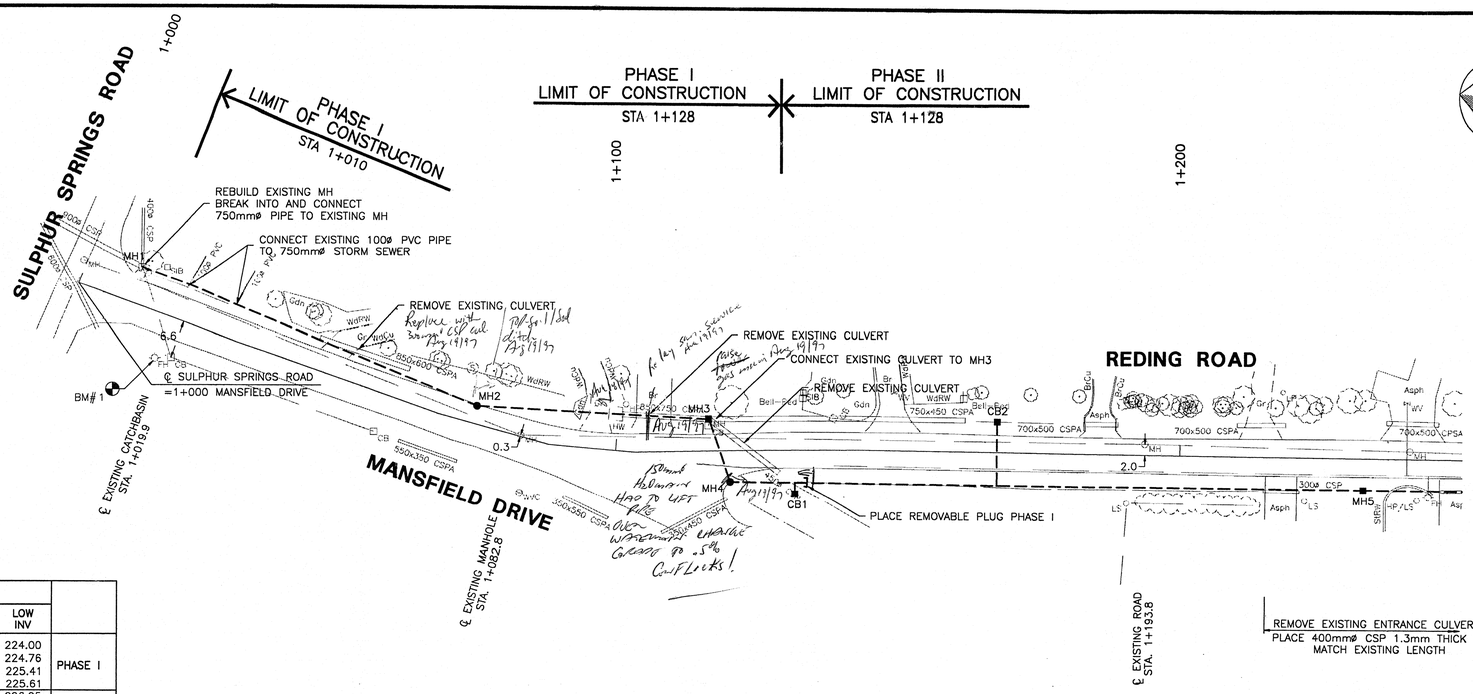
THE LOCATION OF ANY EXISTING UTILITIES SHOWN ON THE DRAWINGS IS APPROXIMATE ONLY. THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION BY ARRAGING FOR FIELD LOCATES WITH ALL THE APPROPRIATE UTILITY COMPANIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITY POLES AND ALL OVERHEAD OR BURIED UTILITY LINES FROM DAMAGE DURING CONSTRUCTION.

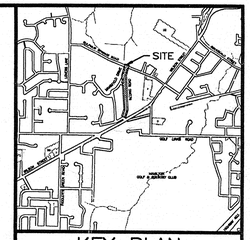
RESTORATION

ROADWAY — 50 HL3 ASPHALT
450 GRANULAR 'A' CRUSHED LIMESTONE

GRASSED AREAS — 100mm TOPSOIL AND SOD
REMOVE AND REINSTATE GARDENS AND STONE WALLS AS DIRECTED BY THE ENGINEER. DITCH FROM MH1 TO MH3 TO BE FILLED AS DIRECTED BY THE ENGINEER.

DRIVEWAYS — 50 HL3 ASPHALT
300 GRANULAR 'A' CRUSHED LIMESTONE





KEY PLAN

LEGEND

- PROPOSED STORM SEWER
- PROPOSED CATCHBASIN/CATCHBASIN MANHOLE
- PROPOSED MANHOLE

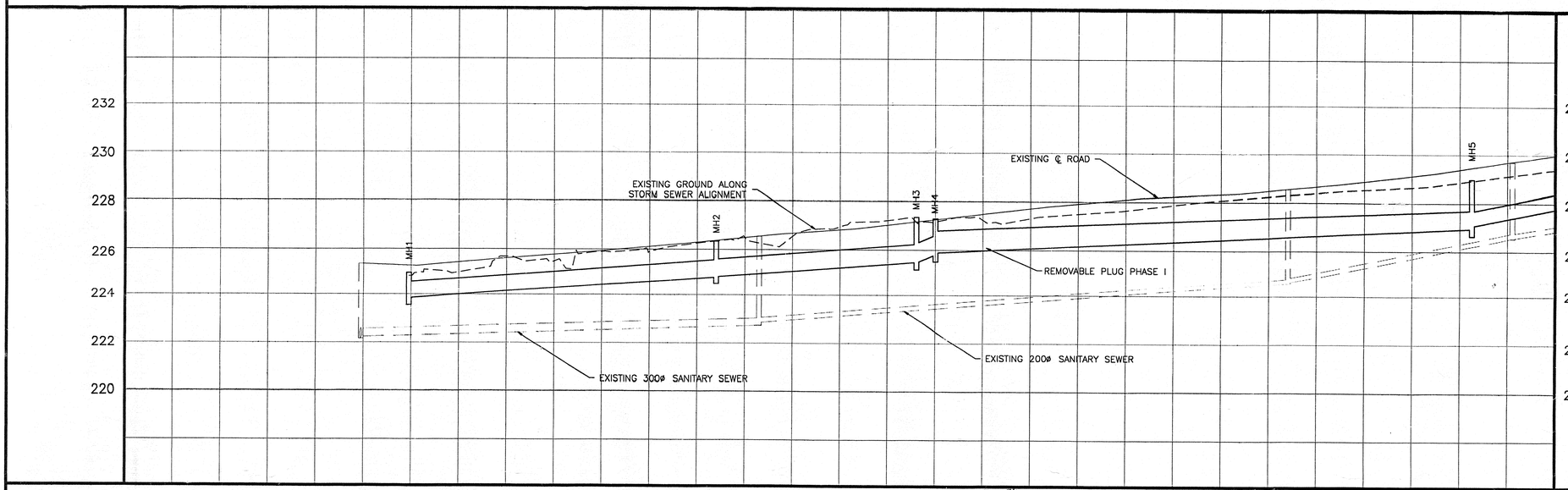
STORM SEWER STUCTURES

NO	STA	OFFSET	STRUCT TYPE	GRATE TYPE	TOP OF GRATE	LOW INV	
MH1	1+010	6.8 Lt	Exist	Exist	225.00	224.00	
MH2	1+074	3.2 Lt	703.010	401.01	226.35	224.76	PHASE I
MH3	1+116	5.8 Lt	703.020	400.11	227.36	225.41	
MH4	1+120	5.5 Rt	703.020	401.01	227.30	225.61	
MH5	1+233	5.6 Rt	703.010	400.11	228.97	226.95	
MH6	1+330	5.9 Rt	701.010	400.11	232.74	230.90	
MH7	1+415	Rt	701.010	400.11	236.60	234.76	PHASE II
MH8	1+423	Lt	701.010	401.01	237.30	235.19	
MH9	1+499	11.7 Lt	Exist	Exist	Exist	239.01	
CB1	1-126	7.8 Rt	705.010	400.11	226.70	226.37	PHASE I
CB2	1+167	5.5 Lt	705.010	400.11	227.60	226.97	
CB3	1+278	5.7 Lt	705.010	400.11	229.90	229.30	PHASE II
CB4	1+414	6.9 Lt	705.010	400.11	236.40	235.16	

BENCHMARKS

GEODEDIC BM#75-U-072 — ELEV. 235.951
DEEP BENCHMARK IN MANHOLE ON MUNICIPAL BUILDING FRONT LAWN.

SITE BM#1 — ELEV. 226.089
EAST NUT ON TOP FLANGE FIRE HYDRANT OPPOSITE HOUSE #112.



STORM SEWER INVERTS	224.00	64m – 750mmø CONC. STORM SEWER @ 1.19% CLASS 65-D	224.76	224.79	41m – 750mmø CONC. STORM SEWER @ 1.5% CLASS 65-D	225.41	225.46	225.61	225.65	110m – 750mmø CONC. STORM SEWER @ 1.18% CLASS 65-D			226.95	227.11
PROPOSED ℄ ROAD ELEVATION	225.38	225.45	225.78	226.12	226.50	226.83	227.27	227.72	228.10	228.32	228.66	229.11	229.67	
CHAINAGE	1+000	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	

11m – 750mmø CONC. STORM SEWER @ 1.4% CLASS 65-D

CHANGE TO 1.5% PVC PIPE TO MATCH.

NO	Date	By	REVISIONS			
1	8/14/97	HHF	INVERTS OF MH2, 3 AND 4		MANU	X
					MANU	CAD

Design	W.F.	Ch'kd	R.R.M.	Date
Drawn	J.P.E.	Ch'kd	W.F.	JUNE 1997

Scale Horiz. 1:500 (0 5 10 20)
Vert. 1:100 (0 1 2 4)

References

APPROVALS

Municipal

Regional

Field Notes

Stamp: REGISTERED PROFESSIONAL ENGINEER R. R. McLAUGHLIN 8/14/97 PROVINCE OF ONTARIO

Philips Planning + Engineering Limited

MANSFIELD DRIVE AND REDING ROAD STORM SEWER
TOWN OF ANCASTER

TITLE

PLAN AND PROFILE STA. 1+010 TO STA. 1+250

Consultant File NO 97036

Regional Drawing NO

CONTRACT NO

Drawing NO

SHEET 1 OF 2

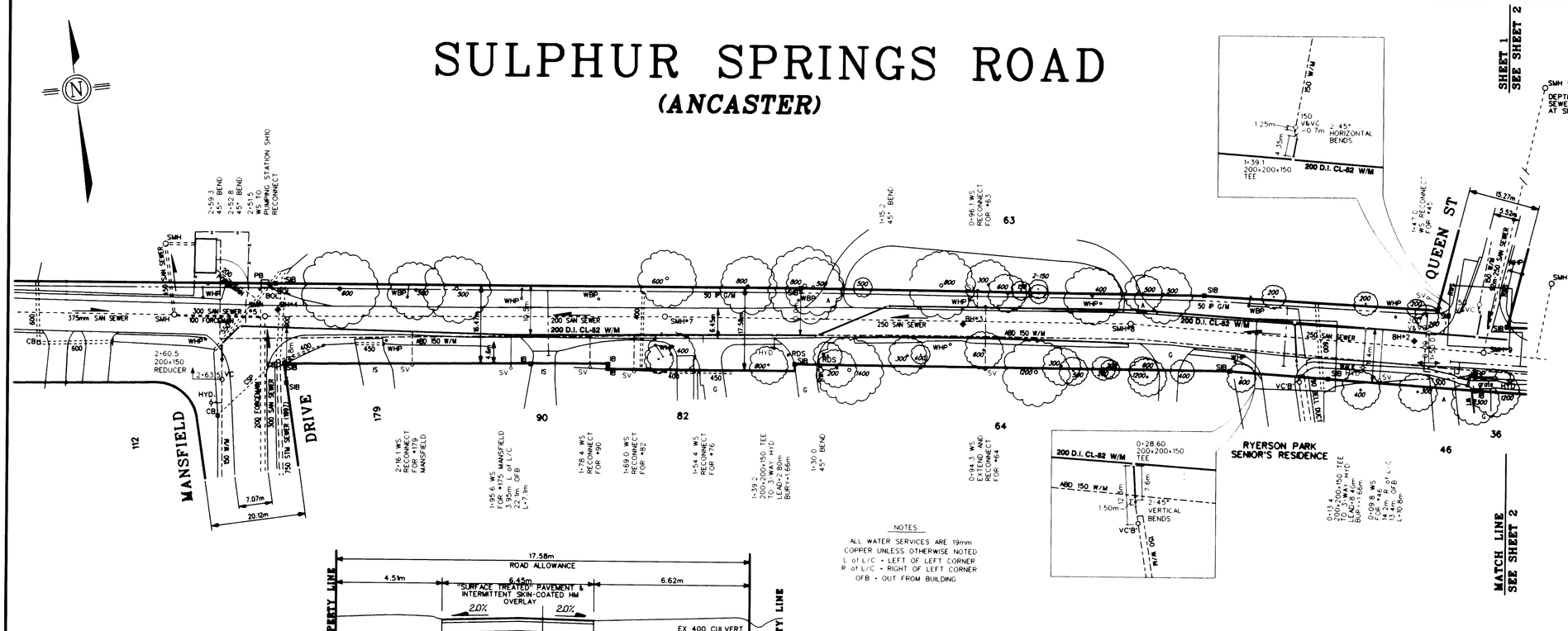
Aug. 14/97 – 97036-01

SULPHUR SPRINGS ROAD (ANCASTER)

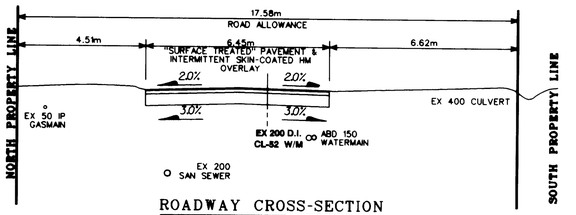
SULPHUR SPRINGS ROAD
(ANCASTER)

CONTRACT No. RHW-97-73 (W)
DRAWING No. 97-W-2AB
FILE No. 819-138

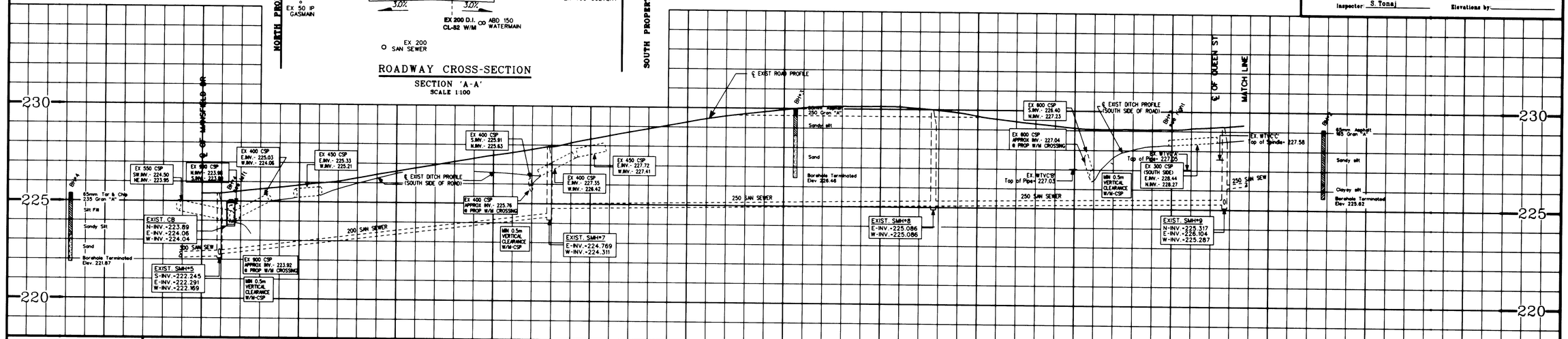
SHEET No. 1 OF 2



NOTES
ALL WATER SERVICES ARE 19mm COPPER UNLESS OTHERWISE NOTED
L of L/C - LEFT OF LEFT CORNER
R of L/C - RIGHT OF LEFT CORNER
OFB - OUT FROM BUILDING



ROADWAY CROSS-SECTION
SECTION 'A-A'
SCALE 1:100



EXISTING ℄ OF ROAD PROFILE ELEVATIONS		225.40	225.39	226.00	226.56	227.06	227.55	227.90	228.64	229.18	229.67	230.00	230.11	230.07	229.99	229.80	229.36	229.07	229.05	229.15	229.23			EXISTING ℄ OF ROAD PROFILE ELEVATIONS
EXISTING ℄ OF ROAD ALLOWANCE C H A I N A G E		0-00	0-04.5 EX.SMH	0-33.7	0-48.7	0-63.5	0-78.3	0-89.4 EX.SMH	1+06	1+23.1	1+38.1	1+52.8	1+67.9	1+82.7	1+88.6 EX.SMH	1+97.5	2+12.4	2+27.5	2+42.2	2+57.1	2+63.3 EX.SMH	2+68.2			EXISTING ℄ OF ROAD ALLOWANCE C H A I N A G E

No.	REVISIONS	INITIAL	DATE
1	AS CONSTRUCTED	CdO	02/28/00

DRAWN BY: RCP/TA DATE: NOVEMBER 7, 1997

REFERENCE MATERIAL:
Regional Surveyor: Gerry Keith
Water Plans : 74-W-523
Sewer Plans : 75-S-591
Geodetic Bench Mark Index No. 75-U-072
Elevation- 235.951m (1978 adj. value)

SCALES
HORIZONTAL 1:500 (0, 5m, 10m, 20m)
VERTICAL 1:100 (0, 1m, 2m, 4m)

DRAWING REVIEW

	DESIGN	PLANNING	CONSTR
SEWER			
WATER			
ROADS			
MANAGER			

DIRECTOR

SENIOR DIRECTOR ROADS DIVISION

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
TRANSPORTATION, OPERATIONS AND ENVIRONMENT DIVISION

SULPHUR SPRINGS ROAD
AS CONSTRUCTED 200 DIA. WATERMAIN
FROM : MANSFIELD DRIVE
TO : WILSON STREET (REGIONAL RD 247)

CERTIFICATE OF COMPLETION
This certifies that the work shown on this drawing has been completed as indicated with all variations and corrections shown in green.

Mar 1 2000
Date

Project Manager

Note:
Work as constructed: Shown in BLUE
Constructed by: OBN Company
Date completed: September 1, 1999
Inspector: S. Tonaj

Pipe material: Ductile iron
Class of Pipe: CL 52
Plotted by: C. den Ouden
Elevations by:

01-MAR-2000 14:29

97-W-2AB (1)

APPENDIX D

Sanitary Servicing Design Information

CROZIER
CONSULTING ENGINEERS

File: 2736-7210
Date: 2024.11.20
By: JW/RW
Check By: JW

Ancaster Sulphur Springs Sanitary Demand

Developed Site Area	6.29	ha
Number of Residential Units and Land Usage		
1) Single Residential	**14**	**units**
2) Block Townhouses	**1.48**	**ha**
Person Per Residential Unit		
1) Single Residential (refer to Section 6.0 of the FSSWMR)	3.96	persons/unit
2) Block Townhouses (per City of Hamilton Engineering guidelines 2019)	110	persons/ha
Total Residential Population	218	Persons
Unit Sewage flows		
Residential (per City of Hamilton Engineering guidelines 2019)	360	L/C-day
Infiltration (per City of Hamilton Engineering guidelines 2019)	0.4	L/s/ha
Total Design Sewage Flows		
Infiltration/Inflow Residential	2.52	L/sec
Average Daily Residential Flow	0.91	L/sec
Residential Peak Factor (Babbitt Formula)	5.00	
Total Peak Daily Flow	**7.06**	**L/sec**

APPENDIX E

Water Servicing Design Information

CROZIER CONSULTING ENGINEERS

File: 2736-7210
Date: 2024.11.20
By: JW/RW
Check By: JW

Ancaster Sulphur Springs Development - Water Demand

Developed Site Area	6.29	ha
Number of Residential Units and Land Usage		
1) Single Residential	**14**	**units**
2) Block Townhouses	**1.48**	**ha**
Person Per Residential Unit		
1) Single Residential (refer to Section 6.0 of the FSSWMR)	3.96	persons/unit
2) Block Townhouses (per City of Hamilton Engineering guidelines 2019)	110	persons/ha
Total Residential Population	218	Persons
Domestic Water Design Flows		
Residential (per City of Hamilton Engineering guidelines 2019)	360	L/C-day
Total Domestic Water Design Flows		
Average Residential Daily Flow	0.91	L/sec
Max Day Peak Factor (Per MECP Design Guidelines for Water Works, 2008)	2.75	
Max Day Demand Flow	**2.50**	L/sec
Peak Hour Factor (Per MECP Design Guidelines for Water Works, 2008)	4.13	
Peak Hour Flow	**3.76**	L/sec

John Willsey

From: Xu, Heli <Heli.Xu@hamilton.ca>
Sent: November 21, 2024 10:45 AM
To: John Willsey
Cc: Ehrenberg, Udo; David Wilcox; HW Approvals
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi John,

Please download the model here https://ln5.sync.com/dl/bc2a1c1c0#fcjwzbub-f8q68wf4-t7kvdsnp-svitk26y

Please use the following boundary conditions for your ADD, MDD, PHD and MDD+FF analysis.

Element	Existing (2021)		Future (2031)	
	Initial Status - HGL		Initial Status - HGL	
HDR018	50% full (233.0m)	75% full (234.6m)	50% full (233.0m)	75% full (234.6m)
HD018-HLP01	OFF	OFF	OFF	OFF
HD018-HLP02	OFF	OFF	OFF	OFF
HD018-HLP03	ON	ON	ON	ON
HD018-HLP04	OFF	OFF	OFF	OFF

Heli Xu
Pronouns: he/him/his
Project Manager - Water and Wastewater Planning
Hamilton Water, Public Works, City of Hamilton
100 King St W, 9th Floor, Hamilton, ON L8P 1A2
Phone: (905) 546-2424 Ext. 1267
Book a meeting with me here for more efficient communication
Hamilton

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Wednesday, November 20, 2024 4:43 PM
To: Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi Heli,

See attached. Please send the model as soon as possible.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

CROZIER

From: Xu, Heli <Heli.Xu@hamilton.ca>
Sent: November 20, 2024 1:10 PM
To: John Willsey <jwillsey@cfcrozier.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi John,

Thank you for your patience. I have prepared a new, error-free model that is ready for your use.

As the model file has been modified, the "Undertaking and Acknowledgement" documents will need to be updated.

Please review the updated document, sign it, and return it to me. I will send you the model file thereafter. Thank you for your understanding.

Heli Xu
Pronouns: he/him/his
Project Manager - Water and Wastewater Planning
Hamilton Water, Public Works, City of Hamilton
100 King St W, 9th Floor, Hamilton, ON L8P 1A2
Phone: (905) 546-2424 Ext. 1267
Book a meeting with me here for more efficient communication
Hamilton

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Monday, November 18, 2024 8:43 AM
To: Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi Heli,

I hope you had a great weekend. Thanks for the update – please let me know when you can send. Any efforts to expedite the release are greatly appreciated.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

From: Xu, Heli <Heli.Xu@hamilton.ca>
Sent: November 14, 2024 11:46 AM
To: John Willsey <jwillsey@cfcrozier.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi John,

We test every model before we send it out. A few errors were found in the pressure district where your property of interest is located. I'll send the model to you after the issues are resolved.

Heli Xu
Pronouns: he/him/his
Project Manager - Water and Wastewater Planning
Hamilton Water, Public Works, City of Hamilton
100 King St W, 9th Floor, Hamilton, ON L8P 1A2
Phone: (905) 546-2424 Ext. 1267
Book a meeting with me here for more efficient communication

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Thursday, November 14, 2024 11:11 AM
To: Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi Heli,

Kindly following up to see when you're able to release this information to us.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

CROZIER

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: November 11, 2024 6:40 PM
To: Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi Heli,

Please find attached signed forms. Please provide the model and boundary conditions as soon as possible.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

From: Xu, Heli <Heli.Xu@hamilton.ca>
Sent: November 8, 2024 3:31 PM
To: John Willsey <jwillsey@cfcrozier.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>; HW Approvals <hwapprovals@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hi John,

Thank you for reaching out to me.

There are two documents need to be signed. Please fill in the highlighted fields on the attached two forms and sign them. You can sign these documents electronically by applying your digital signature, or alternatively, print them, sign them manually, scan the signed copies, and return them to me.

I'll share the model and the boundary conditions after you return the signed documents to me. For the requirements for the hydraulic analysis, please consult the City's Planning and Economic Development group.

Heli Xu
Pronouns: he/him/his
Project Manager - Water and Wastewater Planning
Hamilton Water, Public Works, City of Hamilton
100 King St W, 9th Floor, Hamilton, ON L8P 1A2
Phone: (905) 546-2424 Ext. 1267
Book a meeting with me here for more efficient communication

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Friday, November 8, 2024 3:15 PM
To: HW Approvals <hwapprovals@hamilton.ca>; Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

External Email: Use caution with links and attachments

Hi Heli,

Thanks again for the call yesterday. Just wanted to follow up on when you think you can send over the information release form and provide the WaterCAD model for our use, as discussed. Let me know if you have any other questions.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

CROZIER

From: HW Approvals <hwapprovals@hamilton.ca>
Sent: November 5, 2024 11:21 AM
To: Xu, Heli <Heli.Xu@hamilton.ca>
Cc: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; John Willsey <jwillsey@cfcrozier.ca>
Subject: FW: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Good morning Heli,

Please see the inquiry from John below.

Thank you,

Nicholas Sakellis

Infrastructure Data Technologist
Public Works | Water & Wastewater Systems Planning
Hamilton Water | City of Hamilton

E: nick.sakellis@hamilton.ca
T: (905) 564-2424 ex. 8906

Hamilton

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Tuesday, November 5, 2024 10:14 AM
To: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; Panovski, Zivko <Zivko.Panovski@hamilton.ca>; Development Engineering Approvals <DevEngApprovals@hamilton.ca>; Primmer, Sarah <SPrimmer@geiconsultants.com>; HW Approvals <hwapprovals@hamilton.ca>
Cc: Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hello @HW Approvals,

Can you please provide the form to request the model and/or the boundary conditions as noted in the below email chain.

Thank you,
John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

CROZIER

From: Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>
Sent: November 5, 2024 10:09 AM
To: Panovski, Zivko <Zivko.Panovski@hamilton.ca>; John Willsey <jwillsey@cfcrozier.ca>; Development Engineering Approvals

<DevEngApprovals@hamilton.ca>; Primmer, Sarah <SPrimmer@geiconsultants.com>
Cc: Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>; HW Approvals <hwapprovals@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>
Subject: Re: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Hello,

The City's water model is in the WaterCAD platform.

To request the model, please submit to HWApprovals@hamilton.ca Staff will follow up with you form there.

Udo

Hamilton
Water

Udo Ehrenberg, P.Eng.

Senior Project Manager, Water Planning

City of Hamilton | Public Works Department | Hamilton Water Division

****** NEW ******

100 King Street West

Hamilton, ON

L8P 1A2

T: 905.973.3258

udo.ehrenberg@hamilton.ca

From: Panovski, Zivko <Zivko.Panovski@hamilton.ca>
Sent: Tuesday, November 5, 2024 9:46 AM
To: John Willsey <jwillsey@cfcrozier.ca>; Development Engineering Approvals <DevEngApprovals@hamilton.ca>; Primmer, Sarah <SPrimmer@geiconsultants.com>
Cc: Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>; HW Approvals <hwapprovals@hamilton.ca>; Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

HI John,

The Hamilton Water has ownership of the City's water model. Relevant City staff is included in this correspondence.

Zivko Panovski, P. Eng.

Senior Project Manager

PED, Growth Management Division

City of Hamilton

From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Tuesday, November 5, 2024 9:35 AM
To: Panovski, Zivko <Zivko.Panovski@hamilton.ca>; Development Engineering Approvals <DevEngApprovals@hamilton.ca>; Primmer, Sarah <SPrimmer@geiconsultants.com>
Cc: Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>; HW Approvals <hwapprovals@hamilton.ca>; Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>; David Wilcox <dwilcox@cfcrozier.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

External Email: Use caution with links and attachments

Hi Zivko,

Thanks for getting back to me. It was my understanding the City used InfoWater as their water modelling software.

To clarify, we are requesting this information to run an internal model for our own proposed development as part of an upcoming planning application at the noted site. If you could just provide us boundary conditions at our proposed connection location for average day, peak hour, max day, and max day plus fire flow scenarios, that would be sufficient. Thank you.

Best,

John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER

From: Panovski, Zivko <Zivko.Panovski@hamilton.ca>
Sent: November 5, 2024 9:18 AM

To: Development Engineering Approvals <DevEngApprovals@hamilton.ca>; John Willsey <jwillsey@cfcrozier.ca>; Primmer, Sarah <SPrimmer@geiconsultants.com>
Cc: Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>; HW Approvals <hwapprovals@hamilton.ca>; Ehrenberg, Udo <Udo.Ehrenberg@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

HI John,

The City staff could offer you access to the City's coarse water model to my understanding . There is a process in place to obtain access to the City water model.

However, our office not sure if your organization has compactable software to run the model.

Hi Udi/Sarah,

Would you please advise if InfoWater is compactable with the City's water model?

Thank you.

Zivko Panovski, P. Eng.

Senior Project Manager

PED, Growth Management Division

City of Hamilton

From: Development Engineering Approvals <DevEngApprovals@hamilton.ca>
Sent: Monday, November 4, 2024 10:07 AM
To: Panovski, Zivko <Zivko.Panovski@hamilton.ca>
Subject: FW: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

HI Zivko, they keep emailing about this.

Please note that 905-546-2822 line is working and we can transfer your call within the City.

Keep smiling 😊

Debbie Ritskes

Development Clerk, Growth Management

City of Hamilton – City Hall

71 Main Street West, 6th Floor

Hamilton ON L8P 4Y5

(905) 546-2822

Hamilton

Keep Smiling 😊

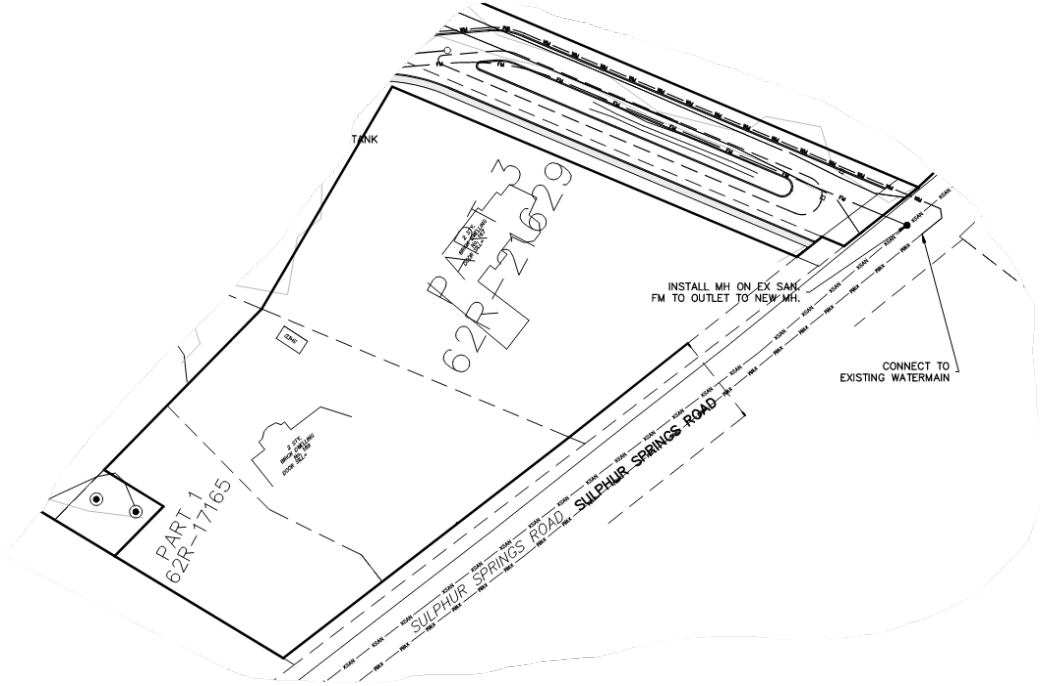
From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Monday, November 4, 2024 9:34 AM
To: David Wilcox <dwilcox@cfcrozier.ca>; Development Engineering Approvals <DevEngApprovals@hamilton.ca>; Vraets, John <john.vraets@hamilton.ca>; SPIDER Requests <SPIDER.Requests@hamilton.ca>; Abdelaal, Ahmed <Ahmed.Abdelaal@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Good morning,

I hope everyone had a good weekend. I'm copying in @Ahmed.Abdelaal@hamilton.ca to assist with the below request:

We have been retained by the landowners of 159 & 163 Sulphur Springs Road in Hamilton (Ancaster) and are undergoing preliminary investigations for the site to facilitate an upcoming planning application. Would you be able to provide us with boundary conditions for the existing 200 mm dia. Watermain on Sulphur Springs Road that the City has available? This would allow us to undertake InfoWater modelling to help confirm the viability of our proposed water servicing.

Snipped below is a figure for reference where the connection to the existing watermain would be fronting our site. Attached is a sketch showing the site location. Please let me know if you have any questions or require any further details.



Thank you,

John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

Celebrating 20 years and another year as one of Canada's Top Growing Companies.

CROZIER

From: David Wilcox <dwilcox@cfcrozier.ca>
Sent: November 1, 2024 9:35 AM
To: Development Engineering Approvals <DevEngApprovals@hamilton.ca>; John Willsey <jwillsey@cfcrozier.ca>; Vraets, John <john.vraets@hamilton.ca>; SPIDER Requests <SPIDER.Requests@hamilton.ca>
Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Thank you Debbie much appreciated. I'm not sure why the spider system is down for so long but appreciate whatever you can do in the meantime to assist.

Happy Friday!

David Wilcox, P.Eng.
Senior Project Manager, Land Development
DID: 705.719.3460|Cell: 416.525.8723

-------- Original message --------

From: Development Engineering Approvals <DevEngApprovals@hamilton.ca>

Date: 2024-11-01 8:40 a.m. (GMT-05:00)

To: John Willsey <jwillsey@cfcrozier.ca>, Development Engineering Approvals <DevEngApprovals@hamilton.ca>, "Vraets, John" <john.vraets@hamilton.ca>, SPIDER Requests <SPIDER.Requests@hamilton.ca>

Cc: David Wilcox <dwilcox@cfcrozier.ca>

Subject: RE: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

Good morning, we had already spoken yesterday about this property. Since spider isn't available until nov 6???? I have forwarded your email to one of my colleges to look into

Please note that 905-546-2822 line is working and we can transfer your call within the City.

Keep smiling 😊

Debbie Ritskes

Development Clerk, Growth Management

City of Hamilton – City Hall

71 Main Street West, 6th Floor

Hamilton ON L8P 4Y5

(905) 546-2822

Hamilton

Keep Smiling 😊

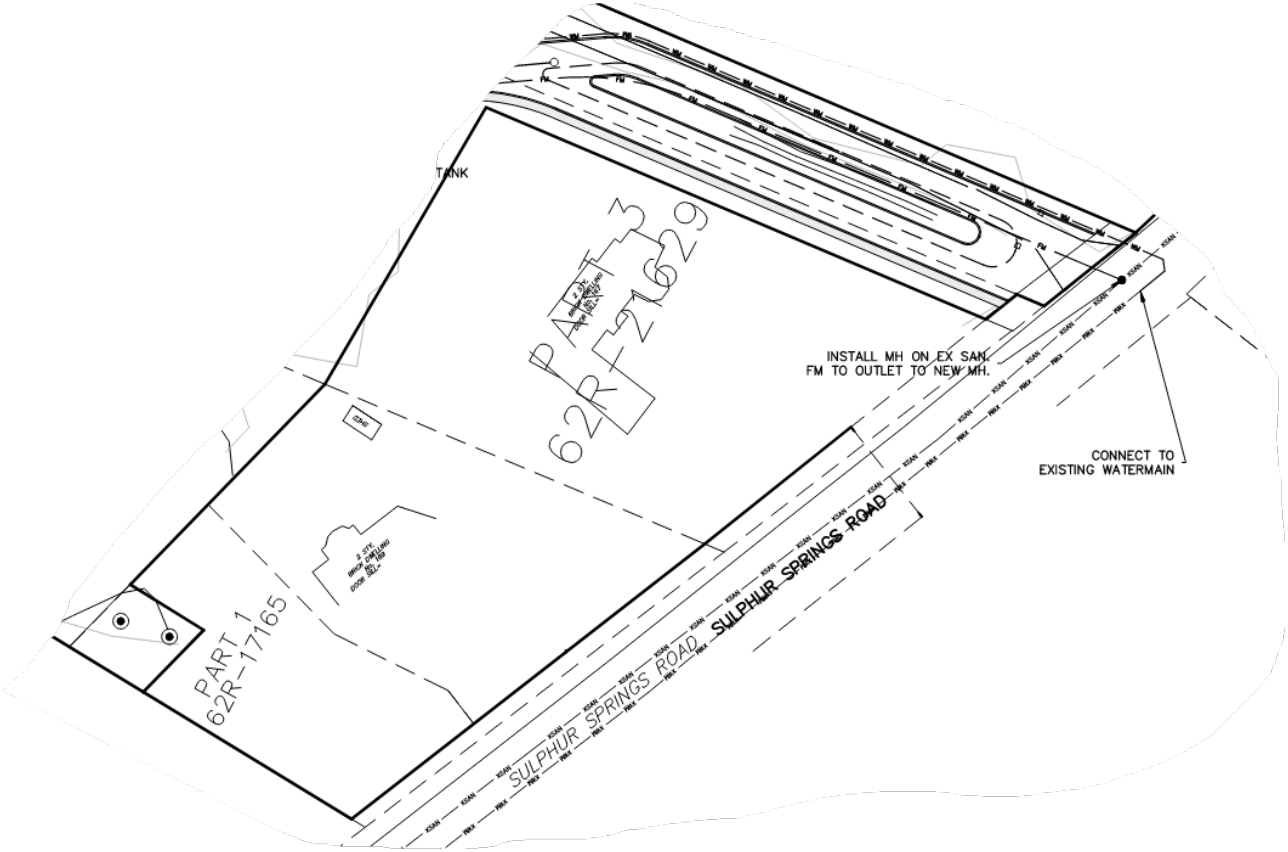
From: John Willsey <jwillsey@cfcrozier.ca>
Sent: Thursday, October 31, 2024 4:35 PM
To: Development Engineering Approvals <DevEngApprovals@hamilton.ca>; Vraets, John <john.vraets@hamilton.ca>; SPIDER Requests <SPIDER.Requests@hamilton.ca>
Cc: David Wilcox <dwilcox@cfcrozier.ca>
Subject: CFC File 2736-7210 - Sulphur Springs Road - InfoWater Boundary Conditions

External Email: Use caution with links and attachments

Good afternoon,

We have been retained by the landowners of 159 & 163 Sulphur Springs Road in Hamilton (Ancaster) and are undergoing preliminary investigations for the site to facilitate an upcoming planning application. Would you be able to provide us with boundary conditions for the existing 200 mm dia. Watermain on Sulphur Springs Road that the City has available? This would allow us to undertake InfoWater modelling to help confirm the viability of our proposed water servicing.

Snipped below is a figure for reference where the connection to the existing watermain would be fronting our site. Attached is a sketch showing the site location. Please let me know if you have any questions or require any further details.



Thank you,

John

John Willsey, EIT, MBA
Engineering Intern, Land Development
Office: 705 443 4360
Collingwood | Milton | Toronto | Bradford | Guelph

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CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
File: WaterCAD Inputs
Design by: MF
Date: 04-Nov-24
Updated: 25-Nov-24

Junction Inputs

Junction (ID)	Land Use -	Elevation (m)	Area (ha)	Population (persons)	ADD (L/s)	MDD (L/s)	PH (L/s)
J-1C	-	226.91	-	-	-	-	-
J-2C	Townhouse	221.76	0.30	33	0.14	0.37	0.56
J-3C	Townhouse	222.45	0.30	33	0.14	0.37	0.56
J-4C	Townhouse	222.96	0.30	33	0.14	0.37	0.56
J-5C	Townhouse	221.81	0.30	33	0.14	0.37	0.56
J-6C	Townhouse	216.31	0.30	33	0.14	0.37	0.56
J-7C	Single Detached	208.46	1.82	55	0.23	0.64	0.95
J-8C	-	208.46	-	-	-	-	-
Total	**-**	**-**	**3.30**	**218**	**0.91**	**2.50**	**3.76**

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
File: Pipe Losses
Design by: MF
Date: 04-Nov-24
Updated: 25-Nov-24

PIPE LOSS SUMMARY

Pipe ID P-1C
Location -
Size (mm) 200
Material PVC
Length (m) 197.38

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	1	0.39	0.39
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	2	0.20	0.40
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			1.14

Pipe ID P2-C
Location -
Size (mm) 200
Material PVC
Length (m) 72.2

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			0.35

Pipe ID P3-C
Location -
Size (mm) 200
Material PVC
Length (m) 26

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	0	0.35	0.00
Tee (Branch Flow)	1	1.28	1.28
Total			1.28

Pipe ID P4-C
Location -
Size (mm) 200
Material PVC
Length (m) 130.4

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	2	0.20	0.40
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	1	1.28	1.28
Total			2.03

Pipe ID P5-C
Location -
Size (mm) 200
Material PVC
Length (m) 45.6

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	1	0.10	0.10
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			0.45

Pipe ID P6-C
Location -
Size (mm) 200
Material PVC
Length (m) 100.2

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	1	0.10	0.10
Tee (Line Flow)	0	0.35	0.00
Tee (Branch Flow)	1	1.28	1.28
Total			1.38

Pipe ID P7-C
Location -
Size (mm) 200
Material PVC
Length (m) 143.7

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	2	0.20	0.40
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	0	0.35	0.00
Tee (Branch Flow)	1	1.28	1.28
Total			1.68

Pipe ID P8-C
Location -
Size (mm) 50
Material PVC
Length (m) 43.6

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	1	0.37	0.37
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	3	0.10	0.30
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			1.02

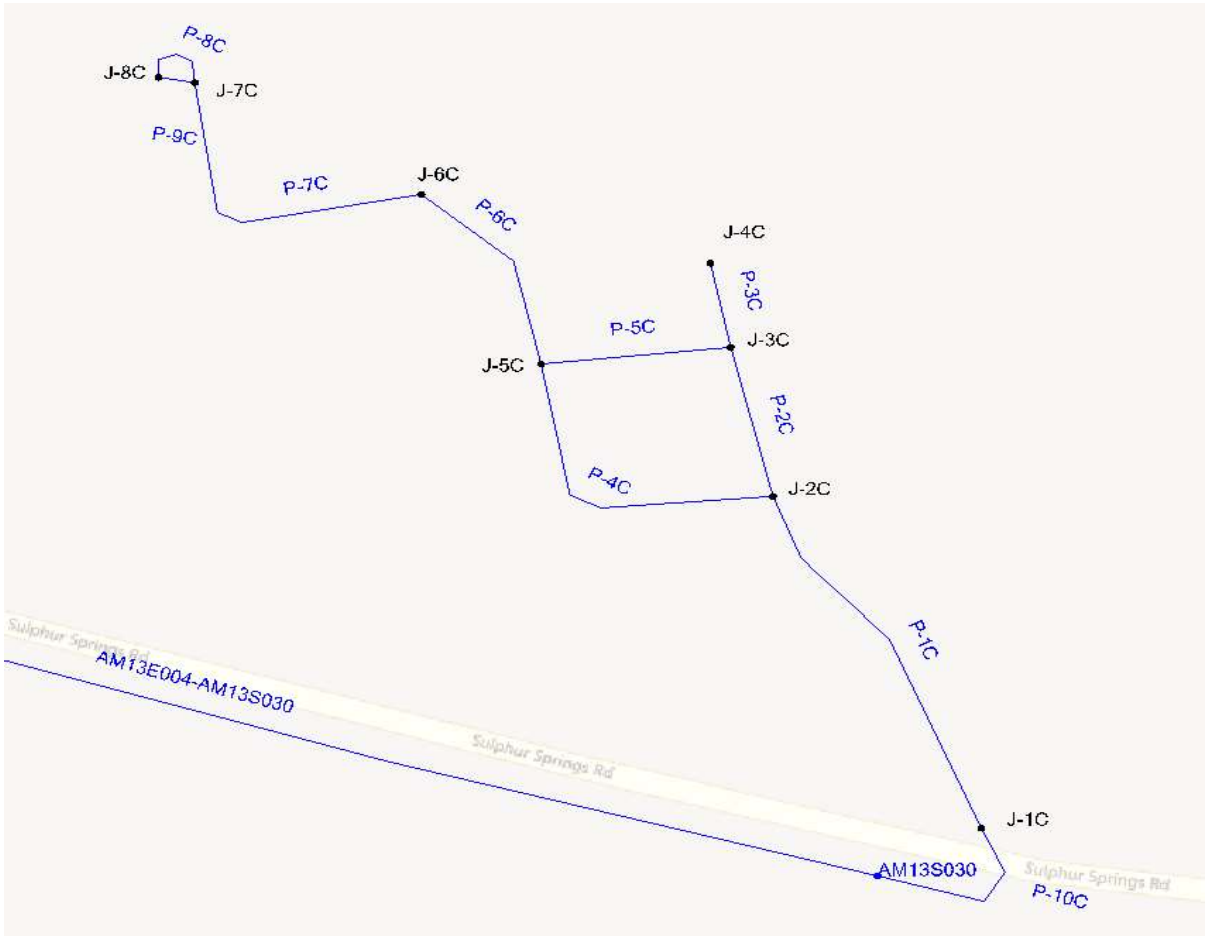
Pipe ID P9-C
Location -
Size (mm) 50
Material PVC
Length (m) 13

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	0	0.20	0.00
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			0.35

Pipe ID P-10C
Location -
Size (mm) 50
Material PVC
Length (m) 56.3

Minor Loss	Number of Fittings	Loss Coef. (K)	SubTotal
Gate Valve (Open)	0	0.39	0.00
90° Bend (R/D=1)	0	0.37	0.00
45° Bend (Mitered)	2	0.20	0.40
30° Bend (Mitered)	0	0.10	0.00
Tee (Line Flow)	1	0.35	0.35
Tee (Branch Flow)	0	1.28	0.00
Total			0.75

Water Model Schematic



Boundary Conditions

Element	Existing (2021)		Future (2031)	
	Initial Status - HGL		Initial Status - HGL	
HDR018	50% full (233.0m)	75% full (234.6m)	50% full (233.0m)	75% full (234.6m)
HD018-HLP01	OFF	OFF	OFF	OFF
HD018-HLP02	OFF	OFF	OFF	OFF
HD018-HLP03	ON	ON	ON	ON
HD018-HLP04	OFF	OFF	OFF	OFF

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 50% (233 m)

Junction Table - Average Day Demand - 2021

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.74**	**98**
J-2C	**221.76**	**18**	**0.14**	**295.74**	**105**
J-3C	**222.45**	**18**	**0.14**	**295.74**	**104**
J-4C	**222.96**	**18**	**0.14**	**295.74**	**103**
J-5C	**221.81**	**18**	**0.14**	**295.74**	**105**
J-6C	**216.31**	**18**	**0.14**	**295.73**	**113**
J-7C	**208.46**	**18**	**0.23**	**295.73**	**124**
J-8C	**208.46**	**18**	**0.00**	**295.73**	**124**
AM13E002	230.00	18	0.00	295.74	93
AM13E003	230.00	18	0.02	295.74	93
AM13E004	226.91	18	0.04	295.74	98
AM13S030	227.70	18	0.04	295.74	97
AM13T005	229.12	18	0.03	295.74	95
AM13V127	229.11	18	0.00	295.74	95

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 50% (233 m)

Pipe Table - Average Day Demand - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**0.93**	**0.03**	**0.00**
P-2C	**J-2C**	**J-3C**	**0.45**	**0.01**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.14**	**0.00**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.34**	**0.01**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.17**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**0.37**	**0.01**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.23**	**0.01**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**0.93**	**0.03**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	1.03	0.03	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-1.01	0.03	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-0.97	0.03	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-1.03	0.03	0.00
AM13V127-AM13E002	AM13V127	AM13E002	1.03	0.03	0.00

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Junction Table - Average Day Demand - 2021

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.74**	**98**
J-2C	**221.76**	**18**	**0.14**	**295.74**	**105**
J-3C	**222.45**	**18**	**0.14**	**295.74**	**104**
J-4C	**222.96**	**18**	**0.14**	**295.74**	**103**
J-5C	**221.81**	**18**	**0.14**	**295.74**	**105**
J-6C	**216.31**	**18**	**0.14**	**295.73**	**113**
J-7C	**208.46**	**18**	**0.23**	**295.73**	**124**
J-8C	**208.46**	**18**	**0.00**	**295.73**	**124**
AM13E002	230.00	18	0.00	295.74	93
AM13E003	230.00	18	0.02	295.74	93
AM13E004	226.91	18	0.04	295.74	98
AM13S030	227.70	18	0.04	295.74	97
AM13T005	229.12	18	0.03	295.74	95
AM13V127	229.11	18	0.00	295.74	95

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Pipe Table - Average Day Demand - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**0.93**	**0.03**	**0.00**
P-2C	**J-2C**	**J-3C**	**0.45**	**0.01**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.14**	**0.00**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.34**	**0.01**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.17**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**0.37**	**0.01**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.23**	**0.01**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**0.93**	**0.03**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	1.03	0.03	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-1.01	0.03	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-0.97	0.03	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-1.03	0.03	0.00
AM13V127-AM13E002	AM13V127	AM13E002	1.03	0.03	0.00

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Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 50% (233 m)

Junction Table - Average Day Demand - 2021

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.04**	**97**
J-2C	**221.76**	**18**	**0.37**	**295.02**	**104**
J-3C	**222.45**	**18**	**0.37**	**295.02**	**103**
J-4C	**222.96**	**18**	**0.37**	**295.02**	**102**
J-5C	**221.81**	**18**	**0.37**	**295.02**	**104**
J-6C	**216.31**	**18**	**0.37**	**295.02**	**112**
J-7C	**208.46**	**18**	**0.64**	**295.02**	**123**
J-8C	**208.46**	**18**	**0.00**	**295.02**	**123**
AM13E002	230.00	18	0.00	295.07	92
AM13E003	230.00	18	0.02	295.07	92
AM13E004	226.91	18	0.07	295.06	97
AM13S030	227.70	18	0.06	295.04	96
AM13T005	229.12	18	0.05	295.07	94
AM13V127	229.11	18	0.00	295.07	94

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Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 50% (233 m)

Pipe Table - Average Day Demand - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.64	0.08	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.62	0.08	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.55	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.64	0.08	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.64	0.08	0.00

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Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Junction Table - Average Day Demand - 2021

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.03**	**97**
J-2C	**221.76**	**18**	**0.37**	**295.02**	**104**
J-3C	**222.45**	**18**	**0.37**	**295.02**	**103**
J-4C	**222.96**	**18**	**0.37**	**295.02**	**102**
J-5C	**221.81**	**18**	**0.37**	**295.02**	**104**
J-6C	**216.31**	**18**	**0.37**	**295.02**	**112**
J-7C	**208.46**	**18**	**0.64**	**295.02**	**123**
J-8C	**208.46**	**18**	**0.00**	**295.02**	**123**
AM13E002	230.00	18	0.00	295.07	92
AM13E003	230.00	18	0.02	295.07	92
AM13E004	226.91	18	0.07	295.06	97
AM13S030	227.70	18	0.06	295.04	96
AM13T005	229.12	18	0.05	295.07	94
AM13V127	229.11	18	0.00	295.07	94

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Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
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HDR18: 75% (234.6 m)

Pipe Table - Average Day Demand - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.64	0.08	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.62	0.08	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.55	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.64	0.08	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.64	0.08	0.00

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HDR18: 50% (233 m)

Junction Table - Max Day + FUS Fire Demand - 2021

Label	Demand (L/s)	Elevation (m)	Zone	Fire Flow Available (L/s)	Pressure (Calculated Residual) (psi)
J-1C	**0.00**	**226.91**	**18**	**104.97**	**20**
J-2C	**0.37**	**221.76**	**18**	**95.06**	**22**
J-3C	**0.37**	**222.45**	**18**	**93.29**	**21**
J-4C	**0.37**	**222.96**	**18**	**91.43**	**20**
J-5C	**0.37**	**221.81**	**18**	**93.76**	**21**
J-6C	**0.37**	**216.31**	**18**	**93.49**	**20**
J-7C	**0.64**	**208.46**	**18**	**92.97**	**20**
AM13E002	0.00	230.00	18	158.34	37
AM13E003	0.02	230.00	18	158.26	35
AM13E004	0.13	226.91	18	158.46	25
AM13S030	0.12	227.70	18	109.78	20
AM13T005	0.10	229.12	18	158.44	47
AM13V127	0.00	229.11	18	158.34	47

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HDR18: 50% (233 m)

Pipe Table - Max Day + Fire Flow - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	(m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.76	0.09	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.74	0.09	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.61	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.76	0.09	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.76	0.09	0.00

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HDR18: 75% (234.6 m)

Junction Table - Max Day + FUS Fire Demand - 2021

Label	Demand (L/s)	Elevation (m)	Zone	Fire Flow Available (L/s)	Pressure (Calculated Residual) (psi)
J-1C	**0.00**	**226.91**	**18**	**106.83**	**20**
J-2C	**0.37**	**221.76**	**18**	**96.25**	**22**
J-3C	**0.37**	**222.45**	**18**	**94.38**	**21**
J-4C	**0.37**	**222.96**	**18**	**92.54**	**20**
J-5C	**0.37**	**221.81**	**18**	**94.85**	**21**
J-6C	**0.37**	**216.31**	**18**	**94.33**	**20**
J-7C	**0.64**	**208.46**	**18**	**93.51**	**20**
AM13E002	0.00	230.00	18	164.03	36
AM13E003	0.02	230.00	18	164.08	34
AM13E004	0.13	226.91	18	164.16	23
AM13S030	0.12	227.70	18	111.64	20
AM13T005	0.10	229.12	18	164.16	47
AM13V127	0.00	229.11	18	164.17	47

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HDR18: 75% (234.6 m)

Pipe Table - Max Day + Fire Flow - 2021

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	(m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.76	0.09	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.74	0.09	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.61	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.76	0.09	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.76	0.09	0.00

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HDR18: 50% (233 m)

Junction Table - Average Day Demand - 2031

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.66**	**98**
J-2C	**221.76**	**18**	**0.14**	**295.66**	**105**
J-3C	**222.45**	**18**	**0.14**	**295.66**	**104**
J-4C	**222.96**	**18**	**0.14**	**295.66**	**103**
J-5C	**221.81**	**18**	**0.14**	**295.66**	**105**
J-6C	**216.31**	**18**	**0.14**	**295.66**	**113**
J-7C	**208.46**	**18**	**0.23**	**295.66**	**124**
J-8C	**208.46**	**18**	**0.00**	**295.66**	**124**
AM13E002	230.00	18	0.00	295.67	93
AM13E003	230.00	18	0.02	295.67	93
AM13E004	226.91	18	0.04	295.67	98
AM13S030	227.70	18	0.04	295.66	96
AM13T005	229.12	18	0.03	295.67	94
AM13V127	229.11	18	0.00	295.67	94

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HDR18: 50% (233 m)

Pipe Table - Average Day Demand - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**0.93**	**0.03**	**0.00**
P-2C	**J-2C**	**J-3C**	**0.45**	**0.01**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.14**	**0.00**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.34**	**0.01**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.17**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**0.37**	**0.01**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.23**	**0.01**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**0.93**	**0.03**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	1.03	0.03	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-1.01	0.03	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-0.97	0.03	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-1.03	0.03	0.00
AM13V127-AM13E002	AM13V127	AM13E002	1.03	0.03	0.00

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HDR18: 75% (234.6 m)

Junction Table - Average Day Demand - 2031

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**295.66**	**98**
J-2C	**221.76**	**18**	**0.14**	**295.66**	**105**
J-3C	**222.45**	**18**	**0.14**	**295.66**	**104**
J-4C	**222.96**	**18**	**0.14**	**295.66**	**103**
J-5C	**221.81**	**18**	**0.14**	**295.66**	**105**
J-6C	**216.31**	**18**	**0.14**	**295.66**	**113**
J-7C	**208.46**	**18**	**0.23**	**295.66**	**124**
J-8C	**208.46**	**18**	**0.00**	**295.66**	**124**
AM13E002	230.00	18	0.00	295.67	93
AM13E003	230.00	18	0.02	295.67	93
AM13E004	226.91	18	0.04	295.67	98
AM13S030	227.70	18	0.04	295.66	96
AM13T005	229.12	18	0.03	295.67	94
AM13V127	229.11	18	0.00	295.67	94

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HDR18: 75% (234.6 m)

Pipe Table - Average Day Demand - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**0.93**	**0.03**	**0.00**
P-2C	**J-2C**	**J-3C**	**0.45**	**0.01**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.14**	**0.00**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.34**	**0.01**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.17**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**0.37**	**0.01**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.23**	**0.01**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**0.93**	**0.03**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	1.03	0.03	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-1.01	0.03	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-0.97	0.03	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-1.03	0.03	0.00
AM13V127-AM13E002	AM13V127	AM13E002	1.03	0.03	0.00

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HDR18: 50% (233 m)

Junction Table - Average Day Demand - 2031

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**294.85**	**96**
J-2C	**221.76**	**18**	**0.37**	**294.83**	**104**
J-3C	**222.45**	**18**	**0.37**	**294.83**	**103**
J-4C	**222.96**	**18**	**0.37**	**294.83**	**102**
J-5C	**221.81**	**18**	**0.37**	**294.83**	**104**
J-6C	**216.31**	**18**	**0.37**	**294.83**	**111**
J-7C	**208.46**	**18**	**0.64**	**294.83**	**123**
J-8C	**208.46**	**18**	**0.00**	**294.83**	**123**
AM13E002	230.00	18	0.00	294.88	92
AM13E003	230.00	18	0.02	294.88	92
AM13E004	226.91	18	0.07	294.87	96
AM13S030	227.70	18	0.06	294.85	95
AM13T005	229.12	18	0.05	294.88	93
AM13V127	229.11	18	0.00	294.88	93

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HDR18: 50% (233 m)

Pipe Table - Average Day Demand - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.65	0.08	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.63	0.08	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.56	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.65	0.08	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.65	0.08	0.00

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Junction Table - Average Day Demand - 2031

Label	Elevation (m)	Zone	Demand (L/s)	Hydraulic Grade (m)	Pressure (psi)
J-1C	**226.91**	**18**	**0.00**	**294.85**	**96**
J-2C	**221.76**	**18**	**0.37**	**294.84**	**104**
J-3C	**222.45**	**18**	**0.37**	**294.84**	**103**
J-4C	**222.96**	**18**	**0.37**	**294.84**	**102**
J-5C	**221.81**	**18**	**0.37**	**294.84**	**104**
J-6C	**216.31**	**18**	**0.37**	**294.83**	**111**
J-7C	**208.46**	**18**	**0.64**	**294.83**	**123**
J-8C	**208.46**	**18**	**0.00**	**294.83**	**123**
AM13E002	230.00	18	0.00	294.88	92
AM13E003	230.00	18	0.02	294.88	92
AM13E004	226.91	18	0.07	294.88	96
AM13S030	227.70	18	0.06	294.86	95
AM13T005	229.12	18	0.05	294.89	93
AM13V127	229.11	18	0.00	294.89	93

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Pipe Table - Average Day Demand - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.65	0.08	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.63	0.08	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.56	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.65	0.08	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.65	0.08	0.00

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 50% (233 m)

Junction Table - Max Day + FUS Fire Demand - 2031

Label	Demand (L/s)	Elevation (m)	Zone	Fire Flow Available (L/s)	Pressure (Calculated Residual) (psi)
J-1C	**0.00**	**226.91**	**18**	**90.31**	**20**
J-2C	**0.37**	**221.76**	**18**	**80.79**	**22**
J-3C	**0.37**	**222.45**	**18**	**79.94**	**21**
J-4C	**0.37**	**222.96**	**18**	**62.80**	**40**
J-5C	**0.37**	**221.81**	**18**	**66.04**	**42**
J-6C	**0.37**	**216.31**	**18**	**81.26**	**23**
J-7C	**0.64**	**208.46**	**18**	**67.28**	**45**
AM13E003	0.02	230.00	18	110.17	41
AM13E004	0.13	226.91	18	102.67	43
AM13S030	0.12	227.70	18	67.90	41
AM13T005	0.10	229.12	18	109.37	48
AM13V127	0.00	229.11	18	110.03	48

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21

HDR18: 50% (233 m)

Pipe Table - Max Day + Fire Flow - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	(m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.78	0.09	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.75	0.09	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.62	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.78	0.09	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.78	0.09	0.00

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21
Revision Date: 2024-11-26

HDR18: 75% (234.6 m)

Junction Table - Max Day + FUS Fire Demand - 2031

Label	Demand (L/s)	Elevation (m)	Zone	Fire Flow Available (L/s)	Pressure (Calculated Residual) (psi)
J-1C	**0.00**	**226.91**	**18**	**90.30**	**22**
J-2C	**0.37**	**221.76**	**18**	**79.26**	**24**
J-3C	**0.37**	**222.45**	**18**	**81.69**	**23**
J-4C	**0.37**	**222.96**	**18**	**81.29**	**20**
J-5C	**0.37**	**221.81**	**18**	**80.04**	**26**
J-6C	**0.37**	**216.31**	**18**	**66.29**	**47**
J-7C	**0.64**	**208.46**	**18**	**82.19**	**25**
AM13E003	0.02	230.00	18	115.32	41
AM13E004	0.13	226.91	18	109.74	40
AM13S030	0.12	227.70	18	95.05	21
AM13T005	0.10	229.12	18	113.11	49
AM13V127	0.00	229.11	18	110.98	50

CROZIER
CONSULTING ENGINEERS

Project: Ancaster Townhomes
Project No.: 2736-7210
Design By: MF
Date: 2024-11-21

HDR18: 75% (234.6 m)

Pipe Table - Max Day + Fire Flow - 2031

Label	Start Node	Stop Node	Flow (L/s)	Velocity (m/s)	(m/m)
P-1C	**J-1C**	**J-2C**	**2.49**	**0.08**	**0.00**
P-2C	**J-2C**	**J-3C**	**1.21**	**0.04**	**0.00**
P-3C	**J-3C**	**J-4C**	**0.37**	**0.01**	**0.00**
P-4C	**J-2C**	**J-5C**	**0.91**	**0.03**	**0.00**
P-5C	**J-3C**	**J-5C**	**0.47**	**0.01**	**0.00**
P-6C	**J-5C**	**J-6C**	**1.01**	**0.03**	**0.00**
P-7C	**J-6C**	**J-7C**	**0.64**	**0.02**	**0.00**
P-8C	**J-8C**	**J-7C**	**0.00**	**0.00**	**0.00**
P-9C	**J-7C**	**J-8C**	**0.00**	**0.00**	**0.00**
P-10C	**AM13S030**	**J-1C**	**2.49**	**0.08**	**0.00**
AM13E002-AM13E003	AM13E002	AM13E003	2.78	0.09	0.00
AM13E003-AM13E004	AM13E004	AM13E003	-2.75	0.09	0.00
AM13E004-AM13S030	AM13S030	AM13E004	-2.62	0.08	0.00
AM13T005-AM13V127	AM13V127	AM13T005	-2.78	0.09	0.00
AM13V127-AM13E002	AM13V127	AM13E002	2.78	0.09	0.00

APPENDIX F

Hydrologic Parameter Sheets

CROZIER CONSULTING ENGINEERS

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-5A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**7.57**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-5A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	7.57
				0
				0
				0
Total Area				7.57

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.238	98	0.255	98	0.000	98	0.493	48.343
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0.238		0.255		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	2.15	55	0.00		0.00		4.93	74	0.00		7.08	482.83
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	2.15		0.00		0.00		4.93		0.00			

Composite Area Calculations		
	Total Pervious Area	7.077
	Total Impervious Area	0.493
	% Impervious	6.52%
	Composite Curve Number	70.2
	Total Area Check	7.57

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	2.150	21.500	0.25	2		0		0		0	0.5375
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	4.927	24.634	0.25	5		0		0		0	1.23168
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.493	0.987	0.98	0		0		0		0	0.48343
Composite		7.57	6.225	Composite Runoff Coefficient								0.29757

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	380	28	7.37%		0.00				0.20	0.13	0.44	0.29

Appropriate calculated time to	Airport	Appropriate Method:	0.29

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-5B**
Project Number:	2736-7210	**D.A. AREA (ha)**	**0.17**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-5B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	0.17
				0
				0
				0
Total Area				0.17

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.000	98	0.000	98	0.000	98	0	0.000
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0		0.000		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.17	55	0.00		0.00		0.00	74	0.00		0.17	9.35
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	0.17		0.00		0.00		0.00		0.00			

Composite Area Calculations		
	Total Pervious Area	0.17
	Total Impervious Area	0
	% Impervious	0.00%
	Composite Curve Number	55.0
	Total Area Check	0.17

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.170	1.700	0.25	0		0		0		0	0.0425
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.000	0.000	0.25	0		0		0		0	0
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.000	0.000	0.98	0		0		0		0	0
Composite		0.17	10.000	Composite Runoff Coefficient								0.25

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	156	30	19.23%		0.00				0.10	0.07	0.22	0.15

Appropriate calculated time to	Airport	Appropriate Method:	0.15

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-7**
Project Number:	2736-7210	**D.A. AREA (ha)**	**2.73**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-7

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	2.73
				0
				0
				0
Total Area				2.73

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.302	98	0.169	98	0.000	98	0.47	46.070
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0.3016		0.169		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	1.12	55	0.00		0.00		1.14	74	0.00		2.26	145.95
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	1.12		0.00		0.00		1.14		0.00			

Composite Area Calculations		
	Total Pervious Area	2.26
	Total Impervious Area	0.47
	% Impervious	17.22%
	Composite Curve Number	70.3
	Total Area Check	2.73

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	1.120	11.200	0.25	1		0		0		0	0.28
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	1.140	5.700	0.25	1		0		0		0	0.28498
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.470	0.940	0.98	0		0		0		0	0.4607
Composite		2.73	6.535	Composite Runoff Coefficient								0.3757

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	70	12	17.14%		0.00				0.03	0.02	0.13	0.09

Appropriate calculated time to	Airport	Appropriate Method:	0.09

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-9A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**1.07**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment PRE-9A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	1.07
				0
				0
				0
Total Area Check				1.07

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	98	0.000	98	0.083	98	0.131	98	0	98	0.214	20.99
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0.0833		0.1309		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.856	74	0		0.856	63.329
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.856		0			

Pervious Area Calculations	Total Pervious Area	0.856
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.083
	Total Indirectly Connected Area	0.131
	Total Impervious Area	0.214
	% X imp	7.8
	% T imp	20.0
	Total Area Check	1.07

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.856	4.279
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	7.14	70	0.25
Impervious	2.0	1	84	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-10**
Project Number:	2736-7210	**D.A. AREA (ha)**	**0.26**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment PRE-10

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	0.26
				0
				0
				0
Total Area Check				0.26

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.117	98	0.000	98	0.000	98	0.000	98	0	98	0.117	11.47
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0.117		0		0		0		0			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.143	74	0		0.143	10.582
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.143		0			

Pervious Area Calculations	Total Pervious Area	0.143
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.117
	Total Indirectly Connected Area	0
	Total Impervious Area	0.117
	% X imp	45.0
	% T imp	45.0
	Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.143	0.715
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	42	0.25
Impervious	2.0	2	42	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-12**
Project Number:	2736-7210	**D.A. AREA (ha)**	**2.47**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-12

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	2.47
				0
				0
				0
Total Area				2.47

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.265	98	0.048	98	0.152	98	0.465	45.580
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0.2646		0.048		0.152			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.00	55	0.00		0.00		2.00	74	0.00		2.00	148.36
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	0.00		0.00		0.00		2.00		0.00			

Composite Area Calculations		
	Total Pervious Area	2.005
	Total Impervious Area	0.465
	% Impervious	18.83%
	Composite Curve Number	78.5
	Total Area Check	2.47

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Ancaster Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.000	0.000	0.25	0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	2.005	10.025	0.25	2		0		0		0	0.50123
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.465	0.930	0.98	0		0		0		0	0.4558
Composite		2.47	4.435	Composite Runoff Coefficient								0.38746

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	100	3	3.00%		0.00				0.07	0.05	0.27	0.18

Appropriate calculated time to	Airport	Appropriate Method:	0.18

Project Name:	Ancaster Townhouse	**D.A. NAME**	**PRE-13**
Project Number:	2736-7210	**D.A. AREA (ha)**	**3.87**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment PRE-13

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	3.87
				0
				0
				0
Total Area				3.87

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.037	98	0.257	98	0.104	98	0.000	98	0.399	39.082
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0.0372		0.2574		0.104		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.00	55	0.00		0.00		3.47	74	0.00		3.47	256.87
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	0.00		0.00		0.00		3.47		0.00			

Composite Area Calculations	Total Pervious Area	3.471	
	Total Impervious Area	0.399	
	% Impervious	10.30%	
	Composite Curve Number	76.5	
	Total Area Check	3.87	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.000	0.000	0.25	0		0		0		0	0
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	3.471	17.356	0.25	3		0		0		0	0.8678
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.399	0.798	0.98	0		0		0		0	0.39082
Composite		3.87	4.691	Composite Runoff Coefficient								0.32523

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	230	26	11.30%		0.00				0.12	0.08	0.29	0.19

Appropriate calculated time to	Airport	Appropriate Method:	0.19

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-5A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**7.57**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment POST-5A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	7.57
				0
				0
				0
Total Area				7.57

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.238	98	0.255	98	0.000	98	0.493	48.343
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0.238		0.255		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	2.15	55	0.00		0.00		4.93	74	0.00		7.08	482.83
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	2.15		0.00		0.00		4.93		0.00			

Composite Area Calculations	Total Pervious Area	7.077	
	Total Impervious Area	0.493	
	% Impervious	6.52%	
	Composite Curve Number	70.2	
	Total Area Check	7.57	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	2.150	21.500	0.25	2		0		0		0	0.544
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	4.927	24.634	0.25	5		0		0		0	1.232
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.493	0.987	0.98	0		0		0		0	0.483
Composite		7.57	6.225	Composite Runoff Coefficient								0.298

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	380	28	7.37%		0.00				0.20	0.13	0.44	0.29

Appropriate calculated time to	Airport	Appropriate Method:	0.29

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-5B**
Project Number:	2736-7210	**D.A. AREA (ha)**	**0.17**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment POST-5B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	0.17
				0
				0
				0
Total Area				0.17

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.000	98	0.000	98	0.000	98	0	0.000
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0		0.000		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.17	55	0.00		0.00		0.00	74	0.00		0.17	9.35
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	0.17		0.00		0.00		0.00		0.00			

Composite Area Calculations	Total Pervious Area	0.17	
	Total Impervious Area	0	
	% Impervious	0.00%	
	Composite Curve Number	55.0	
	Total Area Check	0.17	

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.170	1.700	0.25	0		0		0		0	0.043
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	0.000	0.000	0.25	0		0		0		0	0.000
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.000	0.000	0.98	0		0		0		0	0.000
Composite		0.17	10.000	Composite Runoff Coefficient								0.253

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	156	30	19.23%		0.00				0.10	0.07	0.22	0.15

Appropriate calculated time to	Airport	Appropriate Method:	0.15

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-7**
Project Number:	2736-7210	**D.A. AREA (ha)**	**2.73**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment POST-7

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	2.73
				0
				0
				0
Total Area				2.73

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.000	98	0.302	98	0.169	98	0.000	98	0.4701	46.070
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0		0.3016		0.169		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	1.12	55	0.00		0.00		1.14	74	0.00		2.26	145.95
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	1.12		0.00		0.00		1.14		0.00			

	Composite Area Calculations	Total Pervious Area	2.2599
		Total Impervious Area	0.4701
		% Impervious	17.22%
		Composite Curve Number	70.3
		Total Area Check	2.73

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Ancaster Silt		0		0		0		
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	1.120	11.200	0.25	1.12		0		0		0	0.283
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	1.140	5.700	0.25	1		0		0		0	0.285
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.470	0.940	0.98	0		0		0		0	0.461
Composite		2.73	6.535	Composite Runoff Coefficient								0.377

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	70	12	17.14%		0.00				0.03	0.02	0.13	0.09

Appropriate calculated time to	Airport	Appropriate Method:	0.09

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-9A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**1.07**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-9A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	1.07
				0
				0
				0
Total Area Check				1.07

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	98	0.000	98	0.083	98	0.131	98	0.000	98	0.214	20.99
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0.0833		0.131		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.856	74	0		0.856	63.329
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.856		0			

Pervious Area Calculations	Total Pervious Area	0.856
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.083
	Total Indirectly Connected Area	0.131
	Total Impervious Area	0.214
	% X imp	7.8
	% T imp	20.0
	Total Area Check	1.07

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.856	4.279
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	7.1429	70	0.25
Impervious	2.0	5	84	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-10**
Project Number:	2736-7210	**D.A. AREA (ha)**	**0.26**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-10

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	0.26
				0
				0
				0
Total Area Check				0.26

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.117	98	0.000	98	0.000	98	0.000	98	0.000	98	0.117	11.47
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0.117		0		0		0.000		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.143	74	0		0.143	10.582
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.143		0			

Pervious Area Calculations	Total Pervious Area	0.143
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.117
	Total Indirectly Connected Area	0
	Total Impervious Area	0.117
	% X imp	45.0
	% T imp	45.0
	Total Area Check	0.26

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.143	0.715
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	42	0.25
Impervious	2.0	2	42	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-12A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**1.82**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-12A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	1.82
				0
				0
				0
Total Area Check				1.82

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.445	98	0.067	98	0.064	98	0.476	98	0.000	98	1.051	103.01
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0.445		0.0666		0.06396		0.476		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.769	74	0		0.769	56.894
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.769		0			

Pervious Area Calculations	Total Pervious Area	0.769
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.576
	Total Indirectly Connected Area	0.476
	Total Impervious Area	1.051
	% X imp	31.6
	% T imp	57.8
	Total Area Check	1.82

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.769	3.844
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	20	0.25
Impervious	2.0	1	110	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-12B**
Project Number:	2736-7210	**D.A. AREA (ha)**	**0.65**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-12B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	0.65
				0
				0
				0
Total Area Check				0.65

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	98	0.000	98	0.000	98	0.000	98	0.152	98	0.152	14.92
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0		0		0		0.000		0.152			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		0.498	74	0		0.498	36.837
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		0.498		0			

Pervious Area Calculations	Total Pervious Area	0.498
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.152
	Total Indirectly Connected Area	0
	Total Impervious Area	0.152
	% X imp	23.4
	% T imp	23.4
	Total Area Check	0.65

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.498	2.489
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	70	0.25
Impervious	2.0	1	66	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-13A**
Project Number:	2736-7210	**D.A. AREA (ha)**	**2.38**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment POST-13A

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	2.38
				0
				0
				0
Total Area Check				2.38

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.293	98	0.051	98	0.074	98	0.453	98	0.000	98	0.872	85.41
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal Area	0.293		0.0513		0.0744		0.453		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
An	0.000	55	0		0		1.509	74	0		1.509	111.629
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
0	0		0		0		0		0		0	0
Subtotal Area	0.000		0		0		1.509		0			

Pervious Area Calculations	Total Pervious Area	1.509
	Composite Pervious Curve Number	74
Impervious Area Calculations	Total Directly Connected Area	0.419
	Total Indirectly Connected Area	0.453
	Total Impervious Area	0.872
	% X imp	17.6
	% T imp	36.6
	Total Area Check	2.38

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	0.000	0.000
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	1.509	7.543
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.0	2	20	0.25
Impervious	2.0	2.5	126	0.013

Project Name:	Ancaster Townhouse	**D.A. NAME**	**POST-13B**
Project Number:	2736-7210	**D.A. AREA (ha)**	**1.5**
Date:	2024.11.08		
By:	C.Buscher		

Hydrologic Parameters: CALIB NASHYD Command
Pre Development Drainage Area: Catchment POST-13B

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area
Ancaster Silt Loam	An	B	100	1.5
				0
				0
				0
Total Area				1.5

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.000	98	0.037	98	0.007	98	0.037	98	0.000	98	0.081	7.958
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
0		98		98		98		98		98	0	0
Subtotal	0		0.0372		0.0072		0.037		0.000			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
An	0.00	55	0.00		0.00		1.42	74	0.00		1.42	104.99
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
0	0.00		0.00		0.00		0.00		0.00		0.00	0.00
Subtotal	0.00		0.00		0.00		1.42		0.00			

	Composite Area Calculations	Total Pervious Area	1.419
		Total Impervious Area	0.081
		% Impervious	5.41%
		Composite Curve Number	75.3
		Total Area Check	1.5

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
				Ancaster Silt		0		0		0		
Landuse	IA (mm)	Area (ha)	A * IA	RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	0.000	0.000	0.25	0		0		0		0	0.000
Meadow	8	0	0		0		0		0		0	0
Wetland	16	0	0		0		0		0		0	0
Lawn	5	1.419	7.094	0.25	1		0		0		0	0.355
Cultivated	7	0	0		0		0		0		0	0
Impervious	2	0.081	0.162	0.98	0		0		0		0	0.080
Composite		1.5	4.838	Composite Runoff Coefficient								0.290

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
	141	30	21.28%		0.00				0.07	0.05	0.19	0.13

Appropriate calculated time to	Airport	Appropriate Method:	0.13

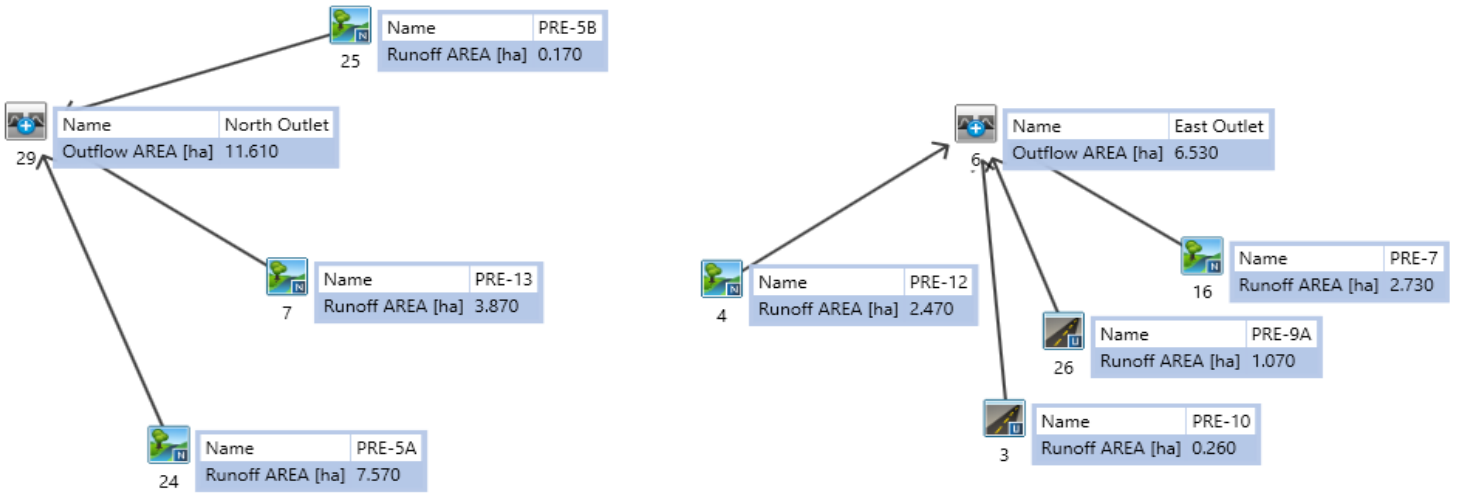
APPENDIX G

Visual OTTHYMO Schematics

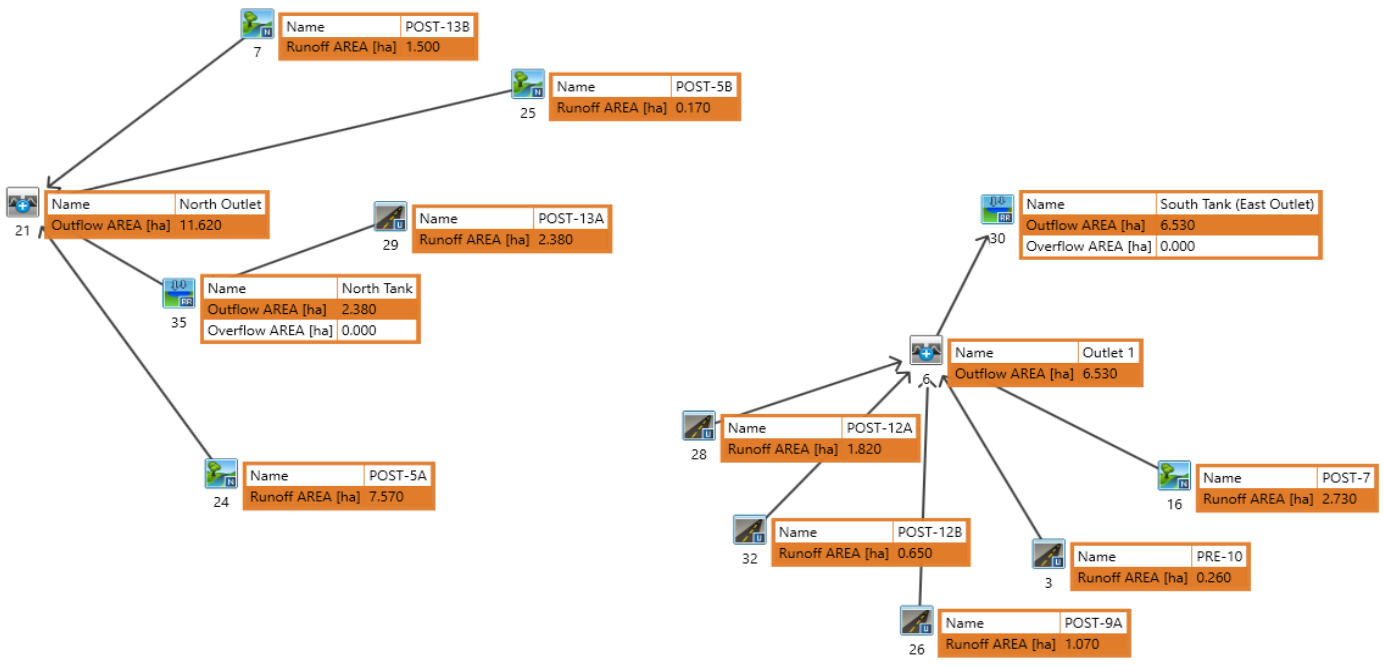
Project: Ancaster Townhomes
Project No.: 2736-7210
File: Model Schematic
Design by: C.Buscher
Date: 2024.11.27

Visual OTTHYMO 6.2 Model Schematic

Pre-Development



Post-Development



PRE-DEV

```
****************************************
** SIMULATION:A. 2yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 646.000
| Ptotal= 33.12 mm |                          B=   3.000
--------------------                          C=   0.781
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    3.07 |  0.83   87.15 |  1.67    5.22 |  2.50    2.94
                0.17    3.73 |  1.00   21.68 |  1.83    4.48 |  2.67    2.72
                0.33    4.85 |  1.17   11.53 |  2.00    3.94 |  2.83    2.53
                0.50    7.18 |  1.33    8.08 |  2.17    3.53 |
                0.67   16.59 |  1.50    6.31 |  2.33    3.20 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   2.47   Curve Number   (CN)= 78.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
               0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
               0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
               0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
               0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
               0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
               0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
               0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
               0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.071 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=   8.356
     TOTAL RAINFALL   (mm)=  33.122
     RUNOFF COEFFICIENT   =   0.252

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
               0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
               0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
               0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
               0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
               0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
               0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
               0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
               0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   1.159

     PEAK FLOW       (cms)=   0.066 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=   5.089
     TOTAL RAINFALL   (mm)=  33.122
```

PRE-DEV

RUNOFF COEFFICIENT = 0.154

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0003)	Area (ha)= 0.26
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

				TOTALS
Max.Eff.Inten.(mm/hr)=		87.15	10.02	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.60 (ii)	19.84 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.33	0.06	
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	1.00	1.25	1.00
RUNOFF VOLUME	(mm)=	32.12	6.74	18.12
TOTAL RAINFALL	(mm)=	33.12	33.12	33.12
RUNOFF COEFFICIENT	=	0.97	0.20	0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Max.Eff.Inten.(mm/hr)=		87.15	15.27
over (min)		5.00	20.00

PRE-DEV

```
     Storage Coeff.  (min)=       1.51 (ii)   15.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.33         0.07
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.027 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.25           1.00
     RUNOFF VOLUME    (mm)=      32.12         7.78           9.72
     TOTAL RAINFALL   (mm)=      33.12        33.12          33.12
     RUNOFF COEFFICIENT   =       0.97         0.23           0.29

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.066     1.00     5.09
     + ID2= 2 (  0026):     1.07   0.027     1.00     9.72
       ================================================
       ID = 3 (  0006):     3.80   0.092     1.00     6.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.092     1.00     6.39
     + ID2= 2 (  0003):     0.26   0.029     1.00    18.12
       ================================================
       ID = 1 (  0006):     4.06   0.121     1.00     7.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     4.06   0.121     1.00     7.14
     + ID2= 2 (  0004):     2.47   0.071     1.17     8.36
       ================================================
       ID = 3 (  0006):     6.53   0.167     1.00     7.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   3.87   Curve Number   (CN)= 76.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.69   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083     3.07 | 0.833    16.59 | 1.583     6.31 |  2.33     3.53
              0.167     3.07 | 0.917    87.14 | 1.667     6.31 |  2.42     3.20
              0.250     3.73 | 1.000    87.15 | 1.750     5.22 |  2.50     3.20
              0.333     3.73 | 1.083    21.68 | 1.833     5.22 |  2.58     2.94
              0.417     4.85 | 1.167    21.68 | 1.917     4.48 |  2.67     2.94
              0.500     4.85 | 1.250    11.53 | 2.000     4.48 |  2.75     2.72
              0.583     7.18 | 1.333    11.53 | 2.083     3.94 |  2.83     2.72
              0.667     7.18 | 1.417     8.08 | 2.167     3.94 |  2.92     2.53
              0.750    16.59 | 1.500     8.08 | 2.250     3.53 |  3.00     2.53

     Unit Hyd Qpeak  (cms)=   0.778

     PEAK FLOW       (cms)=   0.097 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=   7.566
```

PRE-DEV

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     TOTAL RAINFALL   (mm)=  33.122
     RUNOFF COEFFICIENT   =   0.228

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
              0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
              0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
              0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
              0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
              0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
              0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
              0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
              0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   0.997

     PEAK FLOW       (cms)=   0.098 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   5.363
     TOTAL RAINFALL   (mm)=  33.122
     RUNOFF COEFFICIENT   =   0.162

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0025)|   Area    (ha)=   0.17   Curve Number   (CN)= 55.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.15

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
              0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
              0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
              0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
              0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
              0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
              0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
              0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
              0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   0.043

     PEAK FLOW       (cms)=   0.001 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=   2.300
     TOTAL RAINFALL   (mm)=  33.122
     RUNOFF COEFFICIENT   =   0.069

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0024):     7.57   0.098     1.33     5.36
      + ID2= 2 (  0025):     0.17   0.001     1.17     2.30
        ================================================
        ID = 3 (  0029):     7.74   0.099     1.33     5.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):      7.74   0.099     1.33     5.30
     + ID2= 2 (  0007):      3.87   0.097     1.17     7.57
       ================================================
       ID = 1 (  0029):     11.61   0.186     1.25     6.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
****************************************
** SIMULATION:B. 5yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1049.500
| Ptotal= 46.95 mm |                          B=   8.000
--------------------                          C=   0.803
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  3.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.43 |  0.83  103.04 |  1.67    8.05 |  2.50    4.22
                0.17    5.51 |  1.00   36.87 |  1.83    6.77 |  2.67    3.87
                0.33    7.40 |  1.17   19.46 |  2.00    5.86 |  2.83    3.58
                0.50   11.55 |  1.33   13.16 |  2.17    5.18 |
                0.67   28.14 |  1.50    9.97 |  2.33    4.65 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   2.47   Curve Number   (CN)= 78.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.43 | 0.833   28.14 | 1.583    9.97 |  2.33    5.18
               0.167    4.43 | 0.917  103.04 | 1.667    9.97 |  2.42    4.65
               0.250    5.51 | 1.000  103.04 | 1.750    8.05 |  2.50    4.65
               0.333    5.51 | 1.083   36.87 | 1.833    8.05 |  2.58    4.22
               0.417    7.40 | 1.167   36.87 | 1.917    6.77 |  2.67    4.22
               0.500    7.40 | 1.250   19.46 | 2.000    6.77 |  2.75    3.87
               0.583   11.55 | 1.333   19.46 | 2.083    5.86 |  2.83    3.87
               0.667   11.55 | 1.417   13.16 | 2.167    5.86 |  2.92    3.58
               0.750   28.14 | 1.500   13.16 | 2.250    5.18 |  3.00    3.58

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.132 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  16.091
     TOTAL RAINFALL   (mm)=  46.953
     RUNOFF COEFFICIENT   =   0.343

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.43 | 0.833   28.14 | 1.583    9.97 |  2.33    5.18
               0.167    4.43 | 0.917  103.04 | 1.667    9.97 |  2.42    4.65
               0.250    5.51 | 1.000  103.04 | 1.750    8.05 |  2.50    4.65
               0.333    5.51 | 1.083   36.87 | 1.833    8.05 |  2.58    4.22
```

PRE-DEV

0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.124 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 10.658
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.227

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0003) | Area (ha)= 0.26
ID= 1 DT= 5.0 min | Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=		103.04	20.63	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.49 (ii)	15.16 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.33	0.07	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.01	0.035 (iii)
TIME TO PEAK	(hrs)=	1.00	1.25	1.00
RUNOFF VOLUME	(mm)=	45.95	13.42	28.02
TOTAL RAINFALL	(mm)=	46.95	46.95	46.95
RUNOFF COEFFICIENT	=	0.98	0.29	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0026) | Area (ha)= 1.07
ID= 1 DT= 5.0 min | Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

PRE-DEV

0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=	103.04	27.34	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.41 (ii)	12.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.33	0.08	
			TOTALS
PEAK FLOW (cms)=	0.02	0.04	0.053 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.17
RUNOFF VOLUME (mm)=	45.95	15.10	17.56
TOTAL RAINFALL (mm)=	46.95	46.95	46.95
RUNOFF COEFFICIENT =	0.98	0.32	0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0016):		2.73	0.124	1.00	10.66
+ ID2= 2 (0026):		1.07	0.053	1.17	17.56
ID = 3 (0006):		3.80	0.168	1.00	12.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0006):		3.80	0.168	1.00	12.60
+ ID2= 2 (0003):		0.26	0.035	1.00	28.02
ID = 1 (0006):		4.06	0.203	1.00	13.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		4.06	0.203	1.00	13.59
+ ID2= 2 (0004):		2.47	0.132	1.17	16.09
ID = 3 (0006):		6.53	0.299	1.17	14.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0007)			
ID= 1 DT= 5.0 min	Area (ha)=	3.87	Curve Number (CN)= 76.5
	Ia (mm)=	4.69	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.19	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65

PRE-DEV

0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.778

PEAK FLOW (cms)= 0.182 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 14.798
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.315

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0024)	Area (ha)=	7.57	Curve Number (CN)= 70.2
ID= 1 DT= 5.0 min	Ia (mm)=	6.22	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.29	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.205 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 11.152
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.238

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0025)	Area (ha)=	0.17	Curve Number (CN)= 55.0
ID= 1 DT= 5.0 min	Ia (mm)=	10.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.15	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 5.545
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.118

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

PRE-DEV

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--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):     7.57   0.205     1.33    11.15
     + ID2= 2 (  0025):     0.17   0.003     1.17     5.55
       ================================================
       ID = 3 (  0029):     7.74   0.208     1.33    11.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0029):     7.74   0.208     1.33    11.03
     + ID2= 2 (  0007):     3.87   0.182     1.17    14.80
       ================================================
       ID = 1 (  0029):    11.61   0.373     1.25    12.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
****************************************
** SIMULATION:C. 10yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1343.700
| Ptotal= 56.51 mm |                          B=   9.000
--------------------                          C=   0.814
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.00    5.21 |  0.83  122.29 |  1.67    9.68 |  2.50    4.96
               0.17    6.54 |  1.00   45.40 |  1.83    8.09 |  2.67    4.54
               0.33    8.87 |  1.17   23.91 |  2.00    6.97 |  2.83    4.19
               0.50   14.04 |  1.33   16.05 |  2.17    6.13 |
               0.67   34.63 |  1.50   12.06 |  2.33    5.48 |


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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   2.47   Curve Number   (CN)= 78.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    5.21 | 0.833   34.63 | 1.583   12.06 |  2.33    6.13
              0.167    5.21 | 0.917  122.29 | 1.667   12.06 |  2.42    5.48
              0.250    6.54 | 1.000  122.29 | 1.750    9.68 |  2.50    5.48
              0.333    6.54 | 1.083   45.40 | 1.833    9.68 |  2.58    4.96
              0.417    8.87 | 1.167   45.40 | 1.917    8.09 |  2.67    4.96
              0.500    8.87 | 1.250   23.91 | 2.000    8.09 |  2.75    4.54
              0.583   14.04 | 1.333   23.91 | 2.083    6.97 |  2.83    4.54
              0.667   14.04 | 1.417   16.05 | 2.167    6.97 |  2.92    4.19
              0.750   34.63 | 1.500   16.05 | 2.250    6.13 |  3.00    4.19

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.186 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  22.238
     TOTAL RAINFALL   (mm)=  56.506
     RUNOFF COEFFICIENT   =   0.394

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
```

PRE-DEV

---------- U.H. Tp(hrs)= 0.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.184 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 15.300
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.271

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0003) ID= 1 DT= 5.0 min	Area (ha)= 0.26 Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.14
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	41.63	42.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

			TOTALS
Max.Eff.Inten.(mm/hr)=	122.29	29.67	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.39 (ii)	13.21 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.33	0.08	
PEAK FLOW (cms)=	0.04	0.01	0.043 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.00
RUNOFF VOLUME (mm)=	55.51	18.85	35.31
TOTAL RAINFALL (mm)=	56.51	56.51	56.51
RUNOFF COEFFICIENT =	0.98	0.33	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0026) ID= 1 DT= 5.0 min	Area (ha)= 1.07 Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)

PRE-DEV

Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Max.Eff.Inten.(mm/hr)=	122.29	45.69		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.31 (ii)	10.55 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.33	0.09		
			TOTALS	
PEAK FLOW (cms)=	0.03	0.07	0.080 (iii)	
TIME TO PEAK (hrs)=	1.00	1.17	1.17	
RUNOFF VOLUME (mm)=	55.51	20.97	23.72	
TOTAL RAINFALL (mm)=	56.51	56.51	56.51	
RUNOFF COEFFICIENT =	0.98	0.37	0.42	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0016):	2.73	0.184	1.00	15.30
	+ ID2= 2 (0026):	1.07	0.080	1.17	23.72
	ID = 3 (0006):	3.80	0.246	1.00	17.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0006):	3.80	0.246	1.00	17.67
	+ ID2= 2 (0003):	0.26	0.043	1.00	35.31
	ID = 1 (0006):	4.06	0.289	1.00	18.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0006):	4.06	0.289	1.00	18.80
	+ ID2= 2 (0004):	2.47	0.186	1.17	22.24
	ID = 3 (0006):	6.53	0.431	1.17	20.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0007)	Area (ha)= 3.87	Curve Number (CN)= 76.5

PRE-DEV

|ID= 1 DT= 5.0 min | Ia (mm)= 4.69 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.19

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 0.778

PEAK FLOW (cms)= 0.259 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 20.609
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.365

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB NASHYD (0024) | Area (ha)= 7.57 Curve Number (CN)= 70.2
|ID= 1 DT= 5.0 min | Ia (mm)= 6.22 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.29

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.302 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 15.970
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.283

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB NASHYD (0025) | Area (ha)= 0.17 Curve Number (CN)= 55.0
|ID= 1 DT= 5.0 min | Ia (mm)= 10.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

PRE-DEV

```
     Unit Hyd Qpeak  (cms)=   0.043

     PEAK FLOW       (cms)=   0.005 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=   8.453
     TOTAL RAINFALL   (mm)=  56.506
     RUNOFF COEFFICIENT   =   0.150

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0029)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0024):     7.57   0.302     1.33    15.97
      + ID2= 2 (  0025):     0.17   0.005     1.17     8.45
        ==========================================================
        ID = 3 (  0029):     7.74   0.305     1.33    15.81

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0029)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0029):     7.74   0.305     1.33    15.81
      + ID2= 2 (  0007):     3.87   0.259     1.17    20.61
        ==========================================================
        ID = 1 (  0029):    11.61   0.541     1.25    17.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
****************************************
** SIMULATION:D. 25yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1719.500
| Ptotal= 68.68 mm |                          B=  10.000
--------------------                          C=   0.823
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    6.25 |  0.83  146.10 |  1.67   11.80 |  2.50    5.94
                0.17    7.89 |  1.00   56.24 |  1.83    9.82 |  2.67    5.42
                0.33   10.80 |  1.17   29.66 |  2.00    8.42 |  2.83    4.99
                0.50   17.27 |  1.33   19.80 |  2.17    7.38 |
                0.67   42.92 |  1.50   14.79 |  2.33    6.58 |


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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=   2.47   Curve Number   (CN)= 78.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
               0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
               0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
               0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
               0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
               0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
               0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
               0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
               0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Unit Hyd Qpeak  (cms)=   0.524

     PEAK FLOW       (cms)=   0.260 (i)
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PRE-DEV

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     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  30.770
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.448

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
              0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
              0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
              0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
              0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
              0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
              0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
              0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
              0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Unit Hyd Qpeak  (cms)=   1.159

     PEAK FLOW       (cms)=   0.271 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=  21.959
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.320

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0003)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  45.00   Dir. Conn.(%)=  45.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      41.63        42.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
              0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
              0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
              0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
              0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
              0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
              0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
              0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
              0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Max.Eff.Inten.(mm/hr)=     146.10        49.82
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       1.30 (ii)   10.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.33         0.09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.01          0.053 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      67.68        26.52          45.02
     TOTAL RAINFALL   (mm)=      68.68        68.68          68.68
     RUNOFF COEFFICIENT   =       0.99         0.39           0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

PRE-DEV

```
           CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0026)|   Area    (ha)=   1.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   8.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.21         0.86
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       5.00         7.10
     Length            (m)=      84.46        70.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
              0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
              0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
              0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
              0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
              0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
              0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
              0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
              0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Max.Eff.Inten.(mm/hr)=     146.10        64.51
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.22 (ii)    9.27 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.11          0.120 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      67.68        29.16          32.23
     TOTAL RAINFALL   (mm)=      68.68        68.68          68.68
     RUNOFF COEFFICIENT   =       0.99         0.42           0.47

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.271     1.00    21.96
     + ID2= 2 (  0026):     1.07   0.120     1.08    32.23
       ================================================
       ID = 3 (  0006):     3.80   0.386     1.00    24.85

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.386     1.00    24.85
     + ID2= 2 (  0003):     0.26   0.053     1.00    45.02
       ================================================
       ID = 1 (  0006):     4.06   0.439     1.00    26.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| ADD HYD  (  0006)|
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PRE-DEV

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|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     4.06   0.439     1.00    26.14
      + ID2= 2 (  0004):     2.47   0.260     1.17    30.77
        ================================================
        ID = 3 (  0006):     6.53   0.632     1.08    27.89

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD   (  0007)|   Area     (ha)=   3.87   Curve Number   (CN)= 76.5
|ID= 1 DT= 5.0 min |   Ia       (mm)=   4.69   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
              0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
              0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
              0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
              0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
              0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
              0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
              0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
              0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Unit Hyd Qpeak  (cms)=   0.778

     PEAK FLOW       (cms)=   0.367 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  28.738
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.418

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB             |
| NASHYD   (  0024)|   Area     (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
              0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
              0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
              0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
              0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
              0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
              0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
              0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
              0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Unit Hyd Qpeak  (cms)=   0.997

     PEAK FLOW       (cms)=   0.441 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  22.878
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.333

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB             |
| NASHYD   (  0025)|   Area     (ha)=   0.17   Curve Number   (CN)= 55.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=  10.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.15

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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PRE-DEV

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.007 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 12.842
TOTAL RAINFALL (mm)= 68.678
RUNOFF COEFFICIENT = 0.187

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0024):	7.57	0.441	1.33	22.88
	+ ID2= 2 (0025):	0.17	0.007	1.17	12.84
	ID = 3 (0029):	7.74	0.446	1.33	22.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0029):	7.74	0.446	1.33	22.66
	+ ID2= 2 (0007):	3.87	0.367	1.17	28.74
	ID = 1 (0029):	11.61	0.782	1.25	24.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION:E. 50yr 3hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 76.86 mm

IDF curve parameters: A=1954.800
B= 10.000
C= 0.826
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.91	0.83	164.61	1.67	13.11	2.50	6.57
0.17	8.74	1.00	63.07	1.83	10.90	2.67	5.99
0.33	11.99	1.17	33.14	2.00	9.34	2.83	5.51
0.50	19.23	1.33	22.06	2.17	8.17		
0.67	48.07	1.50	16.45	2.33	7.28		

CALIB NASHYD (0004)	ID= 1 DT= 5.0 min

Area (ha)= 2.47 Curve Number (CN)= 78.5
Ia (mm)= 4.44 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.18

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17

PRE-DEV

0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 0.524

PEAK FLOW (cms)= 0.317 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 36.851
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.479

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0016)
ID= 1 DT= 5.0 min

Area (ha)= 2.73 Curve Number (CN)= 70.3
Ia (mm)= 6.53 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.341 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 26.823
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.349

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 0.26
Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.12	0.14
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	41.63	42.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Max.Eff.Inten.(mm/hr)=	164.61	61.86
over (min)	5.00	15.00
Storage Coeff. (min)=	1.24 (ii)	10.04 (ii)

PRE-DEV

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     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.33         0.10
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.05         0.02          0.061 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      75.86        32.05          51.74
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.42           0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0026)|   Area    (ha)=   1.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   8.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.21         0.86
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       5.00         7.10
     Length            (m)=      84.46        70.00
     Mannings n             =    0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Max.Eff.Inten.(mm/hr)=     164.61        79.46
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.17 (ii)    8.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.13          0.150 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      75.86        35.02          38.29
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.46           0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.341     1.00    26.82
     + ID2= 2 (  0026):     1.07   0.150     1.08    38.29
       ==========================================================
       ID = 3 (  0006):     3.80   0.484     1.00    30.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0006)|
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PRE-DEV

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|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------            (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     3.80   0.484     1.00    30.05
      + ID2= 2 (  0003):     0.26   0.061     1.00    51.74
        ================================================
        ID = 1 (  0006):     4.06   0.545     1.00    31.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------            (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     4.06   0.545     1.00    31.44
      + ID2= 2 (  0004):     2.47   0.317     1.17    36.85
        ================================================
        ID = 3 (  0006):     6.53   0.780     1.08    33.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   3.87   Curve Number   (CN)= 76.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.69   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Unit Hyd Qpeak  (cms)=   0.778

     PEAK FLOW       (cms)=   0.450 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  34.565
     TOTAL RAINFALL   (mm)=  76.857
     RUNOFF COEFFICIENT   =   0.450

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Unit Hyd Qpeak  (cms)=   0.997

     PEAK FLOW       (cms)=   0.546 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=  27.922
     TOTAL RAINFALL   (mm)=  76.857
     RUNOFF COEFFICIENT   =   0.363
```

PRE-DEV

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0025)	Area (ha)= 0.17	Curve Number (CN)= 55.0	
ID= 1 DT= 5.0 min	Ia (mm)= 10.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.15		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 16.178
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.210

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0029)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0024):	7.57	0.546	1.33	27.92
	+ ID2= 2 (0025):	0.17	0.009	1.17	16.18
	ID = 3 (0029):	7.74	0.554	1.33	27.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0029):	7.74	0.554	1.33	27.66
	+ ID2= 2 (0007):	3.87	0.450	1.17	34.57
	ID = 1 (0029):	11.61	0.964	1.25	29.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION:F. 100yr 3hr 10min Chicago **
****

CHICAGO STORM	IDF curve parameters: A=2317.400
Ptotal= 86.08 mm	B= 11.000
	C= 0.836

used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	7.60	0.83	181.81	1.67	14.69	2.50	7.21
0.17	9.69	1.00	71.90	1.83	12.15	2.67	6.56
0.33	13.40	1.17	37.82	2.00	10.36	2.83	6.01
0.50	21.77	1.33	25.04	2.17	9.04		
0.67	54.83	1.50	18.55	2.33	8.02		

PRE-DEV

CALIB					
NASHYD (0004)	Area (ha)=	2.47	Curve Number (CN)=	78.5	
ID= 1 DT= 5.0 min	Ia (mm)=	4.44	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.18			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.524

PEAK FLOW (cms)= 0.381 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 43.974
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.511

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0016)	Area (ha)=	2.73	Curve Number (CN)=	70.3	
ID= 1 DT= 5.0 min	Ia (mm)=	6.53	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.09			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.417 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 32.621
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.379

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0003)	Area (ha)=	0.26			
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)=	45.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04

PRE-DEV

0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Max.Eff.Inten.(mm/hr)=	181.81	74.74	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.19 (ii)	9.35 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.33	0.12	
			TOTALS
PEAK FLOW (cms)=	0.06	0.02	0.075 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.00
RUNOFF VOLUME (mm)=	85.08	38.59	59.49
TOTAL RAINFALL (mm)=	86.08	86.08	86.08
RUNOFF COEFFICIENT =	0.99	0.45	0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Max.Eff.Inten.(mm/hr)=	181.81	95.31	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.12 (ii)	8.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.34	0.13	
			TOTALS
PEAK FLOW (cms)=	0.04	0.17	0.183 (iii)
TIME TO PEAK (hrs)=	1.00	1.08	1.08
RUNOFF VOLUME (mm)=	85.08	41.92	45.37
TOTAL RAINFALL (mm)=	86.08	86.08	86.08
RUNOFF COEFFICIENT =	0.99	0.49	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)

PRE-DEV

```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.417     1.00    32.62
     + ID2= 2 (  0026):     1.07   0.183     1.08    45.37
       ================================================
       ID = 3 (  0006):     3.80   0.591     1.00    36.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------


-------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.591     1.00    36.21
     + ID2= 2 (  0003):     0.26   0.075     1.00    59.49
       ================================================
       ID = 1 (  0006):     4.06   0.666     1.00    37.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------


-------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     4.06   0.666     1.00    37.70
     + ID2= 2 (  0004):     2.47   0.381     1.17    43.97
       ================================================
       ID = 3 (  0006):     6.53   0.951     1.08    40.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   3.87   Curve Number   (CN)= 76.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.69   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.19

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    7.60 | 0.833   54.83 | 1.583   18.55 |  2.33    9.04
              0.167    7.60 | 0.917  181.81 | 1.667   18.55 |  2.42    8.02
              0.250    9.69 | 1.000  181.81 | 1.750   14.69 |  2.50    8.02
              0.333    9.69 | 1.083   71.90 | 1.833   14.69 |  2.58    7.21
              0.417   13.40 | 1.167   71.90 | 1.917   12.15 |  2.67    7.21
              0.500   13.40 | 1.250   37.82 | 2.000   12.15 |  2.75    6.56
              0.583   21.77 | 1.333   37.82 | 2.083   10.36 |  2.83    6.56
              0.667   21.77 | 1.417   25.04 | 2.167   10.36 |  2.92    6.01
              0.750   54.83 | 1.500   25.04 | 2.250    9.04 |  3.00    6.01

     Unit Hyd Qpeak  (cms)=   0.778

     PEAK FLOW       (cms)=   0.543 (i)
     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  41.421
     TOTAL RAINFALL   (mm)=  86.077
     RUNOFF COEFFICIENT   =   0.481

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    7.60 | 0.833   54.83 | 1.583   18.55 |  2.33    9.04
              0.167    7.60 | 0.917  181.81 | 1.667   18.55 |  2.42    8.02
              0.250    9.69 | 1.000  181.81 | 1.750   14.69 |  2.50    8.02
              0.333    9.69 | 1.083   71.90 | 1.833   14.69 |  2.58    7.21
              0.417   13.40 | 1.167   71.90 | 1.917   12.15 |  2.67    7.21
              0.500   13.40 | 1.250   37.82 | 2.000   12.15 |  2.75    6.56
```

PRE-DEV

0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.671 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.935
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.394

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0025)	Area (ha)= 0.17	Curve Number (CN)= 55.0	
ID= 1 DT= 5.0 min	Ia (mm)= 10.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.15		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 20.267
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.235

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0024):	7.57	0.671	1.33	33.94
	+ ID2= 2 (0025):	0.17	0.012	1.17	20.27
	ID = 3 (0029):	7.74	0.680	1.33	33.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0029)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0029):	7.74	0.680	1.33	33.64
	+ ID2= 2 (0007):	3.87	0.543	1.17	41.42
	ID = 1 (0029):	11.61	1.176	1.25	36.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION:H. Hazel **
****

PRE-DEV

READ STORM	Filename: C:\Users\cbuscher\AppData\Local\Temp\5cb06e83-8db8-43ef-914b-230ebeb63624\95c33c93
Ptotal=212.00 mm	Comments: Hazel

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	3.00	13.00	6.00	23.00	9.00	53.00
1.00	4.00	4.00	17.00	7.00	13.00	10.00	38.00
2.00	6.00	5.00	13.00	8.00	13.00	11.00	13.00

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 2.47	Curve Number (CN)= 89.0
	Ia (mm)= 4.44	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.18	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.524

PEAK FLOW (cms)= 0.351 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 179.775
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.848

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0016) ID= 1 DT= 5.0 min	Area (ha)= 2.73	Curve Number (CN)= 85.0
	Ia (mm)= 6.53	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.09	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

PRE-DEV

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.366 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 162.306
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.766

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0016):	2.73	0.366	10.00	162.31
	+ ID2= 2 (0026):	1.07	0.155	10.00	196.54
	ID = 3 (0006):	3.80	0.522	10.00	171.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0006):	3.80	0.522	10.00	171.95
	+ ID2= 2 (0003):	0.26	0.038	10.00	201.06
	ID = 1 (0006):	4.06	0.559	10.00	173.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0006):	4.06	0.559	10.00	173.81

PRE-DEV

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     + ID2= 2 (  0004):     2.47   0.351    10.00   179.77
       ================================================
       ID = 3 (  0006):     6.53   0.910    10.00   176.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   3.87   Curve Number   (CN)= 88.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.69   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.778

     PEAK FLOW       (cms)=   0.546 (i)
     TIME TO PEAK    (hrs)=  10.000
     RUNOFF VOLUME    (mm)= 177.220
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.836

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
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PRE-DEV

0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 1.015 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 166.535
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.786

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0025)	Area (ha)=	0.17	Curve Number (CN)=	74.0	
ID= 1 DT= 5.0 min	Ia (mm)=	10.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.15			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00

PRE-DEV

2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.021 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 139.292
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.657

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

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****************************************
** SIMULATION:A. 2yr 3hr 10min Chicago **
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| CHICAGO STORM    |    IDF curve parameters: A= 646.000
| Ptotal= 33.12 mm |                          B=   3.000
--------------------                          C=   0.781
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    3.07 |  0.83   87.15 |  1.67    5.22 |  2.50    2.94
                0.17    3.73 |  1.00   21.68 |  1.83    4.48 |  2.67    2.72
                0.33    4.85 |  1.17   11.53 |  2.00    3.94 |  2.83    2.53
                0.50    7.18 |  1.33    8.08 |  2.17    3.53 |
                0.67   16.59 |  1.50    6.31 |  2.33    3.20 |


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| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.50   Curve Number   (CN)= 75.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.83   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
               0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
               0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
               0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
               0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
               0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
               0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
               0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
               0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   0.441

     PEAK FLOW       (cms)=   0.043 (i)
     TIME TO PEAK    (hrs)=   1.083
     RUNOFF VOLUME    (mm)=   7.101
     TOTAL RAINFALL   (mm)=  33.122
     RUNOFF COEFFICIENT   =   0.214

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
               0.167    3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
               0.250    3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
               0.333    3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
               0.417    4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
               0.500    4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
               0.583    7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
               0.667    7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
               0.750   16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Unit Hyd Qpeak  (cms)=   0.997

     PEAK FLOW       (cms)=   0.098 (i)
     TIME TO PEAK    (hrs)=   1.333
     RUNOFF VOLUME    (mm)=   5.363
     TOTAL RAINFALL   (mm)=  33.122
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RUNOFF COEFFICIENT = 0.162

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0025)	Area (ha)= 0.17	Curve Number (CN)= 55.0	
ID= 1 DT= 5.0 min	Ia (mm)= 10.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.15		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 2.300
TOTAL RAINFALL (mm)= 33.122
RUNOFF COEFFICIENT = 0.069

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0029)	Area (ha)= 2.38		
ID= 1 DT= 5.0 min	Total Imp(%)= 37.00	Dir. Conn.(%)= 18.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.88	1.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.50	2.00
Length	(m)=	125.96	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Max.Eff.Inten.(mm/hr)=		87.15	24.76	
over (min)		5.00	15.00	
Storage Coeff. (min)=		2.36 (ii)	10.49 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.30	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.10	0.06	0.129 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.00
RUNOFF VOLUME	(mm)=	32.12	8.76	12.96
TOTAL RAINFALL	(mm)=	33.12	33.12	33.12
RUNOFF COEFFICIENT	=	0.97	0.26	0.39

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)

POST-DEV

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      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0035)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1983      0.0342
                          0.0082      0.0019   |    0.2310      0.0374
                          0.0179      0.0038   |    0.2593      0.0402
                          0.0240      0.0074   |    0.2846      0.0425
                          0.0288      0.0115   |    0.3076      0.0444
                          0.0330      0.0156   |    0.3290      0.0463
                          0.0399      0.0195   |    0.3490      0.0482
                          0.0777      0.0234   |    0.3538      0.0487
                          0.0928      0.0272   |    0.3586      0.0491
                          0.1574      0.0308   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)      2.380      0.129      1.00      12.96
   OUTFLOW: ID= 1 (  0035)      2.380      0.031      1.67      12.94
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 24.39
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0140

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--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):     7.57   0.098     1.33     5.36
     + ID2= 2 (  0025):     0.17   0.001     1.17     2.30
       ================================================
       ID = 3 (  0021):     7.74   0.099     1.33     5.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0021):     7.74   0.099     1.33     5.30
     + ID2= 2 (  0035):     2.38   0.031     1.67    12.94
       ================================================
       ID = 1 (  0021):    10.12   0.129     1.33     7.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):    10.12   0.129     1.33     7.09
     + ID2= 2 (  0007):     1.50   0.043     1.08     7.10
       ================================================
       ID = 3 (  0021):    11.62   0.155     1.25     7.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
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0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.066 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 5.089
TOTAL RAINFALL (mm)= 33.122
RUNOFF COEFFICIENT = 0.154

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0003)	Area (ha)= 0.26
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Max.Eff.Inten.(mm/hr)=		87.15	10.02	
over (min)		5.00	20.00	
Storage Coeff. (min)=		1.60 (ii)	19.84 (ii)	
Unit Hyd. Tpeak (min)=		5.00	20.00	
Unit Hyd. peak (cms)=		0.33	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	1.00	1.25	1.00
RUNOFF VOLUME	(mm)=	32.12	6.74	18.12
TOTAL RAINFALL	(mm)=	33.12	33.12	33.12
RUNOFF COEFFICIENT	=	0.97	0.20	0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Max.Eff.Inten.(mm/hr)=	87.15	15.27		
over (min)	5.00	20.00		
Storage Coeff. (min)=	1.51 (ii)	15.82 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.33	0.07		
			TOTALS	
PEAK FLOW (cms)=	0.02	0.02	0.027 (iii)	
TIME TO PEAK (hrs)=	1.00	1.25	1.00	
RUNOFF VOLUME (mm)=	32.12	7.78	9.72	
TOTAL RAINFALL (mm)=	33.12	33.12	33.12	
RUNOFF COEFFICIENT =	0.97	0.23	0.29	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0028)	Area (ha)=	1.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	58.00	Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.06	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	110.15	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.07	0.833	16.59	1.583	6.31	2.33	3.53
0.167	3.07	0.917	87.14	1.667	6.31	2.42	3.20
0.250	3.73	1.000	87.15	1.750	5.22	2.50	3.20
0.333	3.73	1.083	21.68	1.833	5.22	2.58	2.94
0.417	4.85	1.167	21.68	1.917	4.48	2.67	2.94
0.500	4.85	1.250	11.53	2.000	4.48	2.75	2.72
0.583	7.18	1.333	11.53	2.083	3.94	2.83	2.72
0.667	7.18	1.417	8.08	2.167	3.94	2.92	2.53
0.750	16.59	1.500	8.08	2.250	3.53	3.00	2.53

Max.Eff.Inten.(mm/hr)=	87.15	38.98		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.32 (ii)	9.11 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.30	0.12		
			TOTALS	
PEAK FLOW (cms)=	0.14	0.06	0.180 (iii)	
TIME TO PEAK (hrs)=	1.00	1.08	1.00	
RUNOFF VOLUME (mm)=	32.12	10.59	17.48	
TOTAL RAINFALL (mm)=	33.12	33.12	33.12	
RUNOFF COEFFICIENT =	0.97	0.32	0.53	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

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| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   0.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  23.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.15          0.50
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      65.83         70.00
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs    mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083     3.07 | 0.833   16.59 | 1.583    6.31 |  2.33    3.53
              0.167     3.07 | 0.917   87.14 | 1.667    6.31 |  2.42    3.20
              0.250     3.73 | 1.000   87.15 | 1.750    5.22 |  2.50    3.20
              0.333     3.73 | 1.083   21.68 | 1.833    5.22 |  2.58    2.94
              0.417     4.85 | 1.167   21.68 | 1.917    4.48 |  2.67    2.94
              0.500     4.85 | 1.250   11.53 | 2.000    4.48 |  2.75    2.72
              0.583     7.18 | 1.333   11.53 | 2.083    3.94 |  2.83    2.72
              0.667     7.18 | 1.417    8.08 | 2.167    3.94 |  2.92    2.53
              0.750    16.59 | 1.500    8.08 | 2.250    3.53 |  3.00    2.53

     Max.Eff.Inten.(mm/hr)=      87.15         7.96
               over (min)         5.00        30.00
     Storage Coeff.  (min)=       2.10 (ii)   29.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=       0.31         0.04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.01          0.037 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.50           1.00
     RUNOFF VOLUME    (mm)=      32.12         6.74          12.55
     TOTAL RAINFALL   (mm)=      33.12        33.12          33.12
     RUNOFF COEFFICIENT   =       0.97         0.20           0.38

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.066     1.00     5.09
     + ID2= 2 (  0026):     1.07   0.027     1.00     9.72
       ================================================
       ID = 3 (  0006):     3.80   0.092     1.00     6.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.092     1.00     6.39
     + ID2= 2 (  0028):     1.82   0.180     1.00    17.48
       ================================================
       ID = 1 (  0006):     5.62   0.272     1.00     9.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     5.62   0.272     1.00     9.98
     + ID2= 2 (  0003):     0.26   0.029     1.00    18.12
       ================================================
       ID = 3 (  0006):     5.88   0.301     1.00    10.34
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POST-DEV

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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     5.88   0.301     1.00    10.34
      + ID2= 2 (  0032):     0.65   0.037     1.00    12.55
        ================================================
        ID = 1 (  0006):     6.53   0.338     1.00    10.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000      0.0000    |    0.5446      0.0556
                          0.0188      0.0030    |    0.5959      0.0608
                          0.0389      0.0061    |    0.6429      0.0655
                          0.0617      0.0120    |    0.6866      0.0692
                          0.1336      0.0187    |    0.7276      0.0723
                          0.2029      0.0253    |    0.7663      0.0753
                          0.2300      0.0318    |    0.8032      0.0783
                          0.3432      0.0381    |    0.8122      0.0791
                          0.4224      0.0442    |    0.8210      0.0799
                          0.4877      0.0501    |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0006)      6.530      0.338      1.00      10.56
   OUTFLOW: ID= 1 (  0030)      6.530      0.145      1.25      10.56
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                    TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.08
                    TIME SHIFT OF PEAK FLOW         (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0200

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****************************************
** SIMULATION:B. 5yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1049.500
| Ptotal= 46.95 mm |                          B=   8.000
--------------------                          C=   0.803
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    4.43 |  0.83  103.04 |'  1.67    8.05 |  2.50    4.22
                0.17    5.51 |  1.00   36.87 |'  1.83    6.77 |  2.67    3.87
                0.33    7.40 |  1.17   19.46 |'  2.00    5.86 |  2.83    3.58
                0.50   11.55 |  1.33   13.16 |'  2.17    5.18 |
                0.67   28.14 |  1.50    9.97 |'  2.33    4.65 |


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.50   Curve Number   (CN)= 75.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.83   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.43 | 0.833   28.14 | 1.583    9.97 |  2.33    5.18
               0.167    4.43 | 0.917  103.04 | 1.667    9.97 |  2.42    4.65
               0.250    5.51 | 1.000  103.04 | 1.750    8.05 |  2.50    4.65
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POST-DEV

0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.079 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 14.005
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.298

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0024)	Area (ha)=	7.57	Curve Number (CN)=	70.2	
ID= 1 DT= 5.0 min	Ia (mm)=	6.22	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.29			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.205 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 11.152
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.238

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0025)	Area (ha)=	0.17	Curve Number (CN)=	55.0	
ID= 1 DT= 5.0 min	Ia (mm)=	10.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.15			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 5.545
TOTAL RAINFALL (mm)= 46.953
RUNOFF COEFFICIENT = 0.118

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

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--------------------
| CALIB              |
| STANDHYD (  0029)|   Area    (ha)=   2.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  18.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.88          1.50
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.50          2.00
     Length            (m)=     125.96         20.00
     Mannings n             =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.083     4.43 | 0.833    28.14 | 1.583     9.97 |  2.33     5.18
               0.167     4.43 | 0.917   103.04 | 1.667     9.97 |  2.42     4.65
               0.250     5.51 | 1.000   103.04 | 1.750     8.05 |  2.50     4.65
               0.333     5.51 | 1.083    36.87 | 1.833     8.05 |  2.58     4.22
               0.417     7.40 | 1.167    36.87 | 1.917     6.77 |  2.67     4.22
               0.500     7.40 | 1.250    19.46 | 2.000     6.77 |  2.75     3.87
               0.583    11.55 | 1.333    19.46 | 2.083     5.86 |  2.83     3.87
               0.667    11.55 | 1.417    13.16 | 2.167     5.86 |  2.92     3.58
               0.750    28.14 | 1.500    13.16 | 2.250     5.18 |  3.00     3.58

     Max.Eff.Inten.(mm/hr)=     103.04        41.19
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.20 (ii)    8.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.12         0.12          0.211 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      45.95        16.64          21.92
     TOTAL RAINFALL   (mm)=      46.95        46.95          46.95
     RUNOFF COEFFICIENT   =       0.98         0.35           0.47

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0035)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1983      0.0342
                          0.0082      0.0019   |    0.2310      0.0374
                          0.0179      0.0038   |    0.2593      0.0402
                          0.0240      0.0074   |    0.2846      0.0425
                          0.0288      0.0115   |    0.3076      0.0444
                          0.0330      0.0156   |    0.3290      0.0463
                          0.0399      0.0195   |    0.3490      0.0482
                          0.0777      0.0234   |    0.3538      0.0487
                          0.0928      0.0272   |    0.3586      0.0491
                          0.1574      0.0308   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     2.380      0.211      1.00      21.92
   OUTFLOW: ID= 1 (  0035)     2.380      0.075      1.50      21.90
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 35.43
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0232

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POST-DEV

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| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):     7.57   0.205     1.33    11.15
     + ID2= 2 (  0025):     0.17   0.003     1.17     5.55
       ================================================
       ID = 3 (  0021):     7.74   0.208     1.33    11.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0021):     7.74   0.208     1.33    11.03
     + ID2= 2 (  0035):     2.38   0.075     1.50    21.90
       ================================================
       ID = 1 (  0021):    10.12   0.277     1.42    13.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

-------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):    10.12   0.277     1.42    13.58
     + ID2= 2 (  0007):     1.50   0.079     1.08    14.00
       ================================================
       ID = 3 (  0021):    11.62   0.325     1.33    13.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    4.43 | 0.833   28.14 | 1.583    9.97 |  2.33    5.18
               0.167    4.43 | 0.917  103.04 | 1.667    9.97 |  2.42    4.65
               0.250    5.51 | 1.000  103.04 | 1.750    8.05 |  2.50    4.65
               0.333    5.51 | 1.083   36.87 | 1.833    8.05 |  2.58    4.22
               0.417    7.40 | 1.167   36.87 | 1.917    6.77 |  2.67    4.22
               0.500    7.40 | 1.250   19.46 | 2.000    6.77 |  2.75    3.87
               0.583   11.55 | 1.333   19.46 | 2.083    5.86 |  2.83    3.87
               0.667   11.55 | 1.417   13.16 | 2.167    5.86 |  2.92    3.58
               0.750   28.14 | 1.500   13.16 | 2.250    5.18 |  3.00    3.58

     Unit Hyd Qpeak  (cms)=   1.159

     PEAK FLOW       (cms)=   0.124 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=  10.658
     TOTAL RAINFALL   (mm)=  46.953
     RUNOFF COEFFICIENT   =   0.227

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  45.00   Dir. Conn.(%)=  45.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12         0.14
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      41.63        42.00
     Mannings n             =    0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```

POST-DEV

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=	103.04	20.63	
over (min)	5.00	20.00	
Storage Coeff. (min)=	1.49 (ii)	15.16 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.33	0.07	
			TOTALS
PEAK FLOW (cms)=	0.03	0.01	0.035 (iii)
TIME TO PEAK (hrs)=	1.00	1.25	1.00
RUNOFF VOLUME (mm)=	45.95	13.42	28.02
TOTAL RAINFALL (mm)=	46.95	46.95	46.95
RUNOFF COEFFICIENT =	0.98	0.29	0.60

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	0.21	0.86
Dep. Storage (mm)=	1.00	5.00
Average Slope (%)=	5.00	7.10
Length (m)=	84.46	70.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=	103.04	27.34	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.41 (ii)	12.75 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.33	0.08	
			TOTALS
PEAK FLOW (cms)=	0.02	0.04	0.053 (iii)
TIME TO PEAK (hrs)=	1.00	1.17	1.17
RUNOFF VOLUME (mm)=	45.95	15.10	17.56
TOTAL RAINFALL (mm)=	46.95	46.95	46.95
RUNOFF COEFFICIENT =	0.98	0.32	0.37

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

CALIB					
STANDHYD (0028)	Area (ha)= 1.82				
ID= 1 DT= 5.0 min	Total Imp(%)= 58.00	Dir. Conn.(%)= 32.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.06	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	110.15	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=		103.04	62.18	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.17 (ii)	7.80 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.17	0.10	0.240 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	45.95	19.44	27.92
TOTAL RAINFALL	(mm)=	46.95	46.95	46.95
RUNOFF COEFFICIENT	=	0.98	0.41	0.59

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
STANDHYD (0032)	Area (ha)= 0.65				
ID= 1 DT= 5.0 min	Total Imp(%)= 23.00	Dir. Conn.(%)= 23.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.15	0.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	65.83	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.43	0.833	28.14	1.583	9.97	2.33	5.18
0.167	4.43	0.917	103.04	1.667	9.97	2.42	4.65
0.250	5.51	1.000	103.04	1.750	8.05	2.50	4.65
0.333	5.51	1.083	36.87	1.833	8.05	2.58	4.22
0.417	7.40	1.167	36.87	1.917	6.77	2.67	4.22
0.500	7.40	1.250	19.46	2.000	6.77	2.75	3.87
0.583	11.55	1.333	19.46	2.083	5.86	2.83	3.87
0.667	11.55	1.417	13.16	2.167	5.86	2.92	3.58
0.750	28.14	1.500	13.16	2.250	5.18	3.00	3.58

Max.Eff.Inten.(mm/hr)=		103.04	19.19	
over (min)		5.00	25.00	
Storage Coeff. (min)=		1.96 (ii)	21.07 (ii)	
Unit Hyd. Tpeak (min)=		5.00	25.00	
Unit Hyd. peak (cms)=		0.31	0.05	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.01	0.046 (iii)
TIME TO PEAK	(hrs)=	1.00	1.42	1.00

POST-DEV

```
     RUNOFF VOLUME    (mm)=      45.95        13.42          20.88
     TOTAL RAINFALL   (mm)=      46.95        46.95          46.95
     RUNOFF COEFFICIENT   =       0.98         0.29           0.44

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.124     1.00    10.66
     + ID2= 2 (  0026):     1.07   0.053     1.17    17.56
       ================================================
       ID = 3 (  0006):     3.80   0.168     1.00    12.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.168     1.00    12.60
     + ID2= 2 (  0028):     1.82   0.240     1.00    27.92
       ================================================
       ID = 1 (  0006):     5.62   0.409     1.00    17.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     5.62   0.409     1.00    17.56
     + ID2= 2 (  0003):     0.26   0.035     1.00    28.02
       ================================================
       ID = 3 (  0006):     5.88   0.443     1.00    18.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     5.88   0.443     1.00    18.03
     + ID2= 2 (  0032):     0.65   0.046     1.00    20.88
       ================================================
       ID = 1 (  0006):     6.53   0.489     1.00    18.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.5446      0.0556
                          0.0188      0.0030   |    0.5959      0.0608
                          0.0389      0.0061   |    0.6429      0.0655
                          0.0617      0.0120   |    0.6866      0.0692
                          0.1336      0.0187   |    0.7276      0.0723
                          0.2029      0.0253   |    0.7663      0.0753
                          0.2300      0.0318   |    0.8032      0.0783
                          0.3432      0.0381   |    0.8122      0.0791
                          0.4224      0.0442   |    0.8210      0.0799
                          0.4877      0.0501   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0006)     6.530      0.489      1.00      18.31
   OUTFLOW: ID= 1 (  0030)     6.530      0.246      1.25      18.30
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
```

POST-DEV

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                    CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                    PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 50.30
                    TIME SHIFT OF PEAK FLOW         (min)= 15.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0329

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****************************************
** SIMULATION:C. 10yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1343.700
| Ptotal= 56.51 mm |                          B=   9.000
--------------------                          C=   0.814
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    5.21 |  0.83  122.29 |  1.67    9.68 |  2.50    4.96
                0.17    6.54 |  1.00   45.40 |  1.83    8.09 |  2.67    4.54
                0.33    8.87 |  1.17   23.91 |  2.00    6.97 |  2.83    4.19
                0.50   14.04 |  1.33   16.05 |  2.17    6.13 |
                0.67   34.63 |  1.50   12.06 |  2.33    5.48 |


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--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.50   Curve Number   (CN)= 75.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.83   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                           ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.21 | 0.833   34.63 | 1.583   12.06 |  2.33    6.13
               0.167    5.21 | 0.917  122.29 | 1.667   12.06 |  2.42    5.48
               0.250    6.54 | 1.000  122.29 | 1.750    9.68 |  2.50    5.48
               0.333    6.54 | 1.083   45.40 | 1.833    9.68 |  2.58    4.96
               0.417    8.87 | 1.167   45.40 | 1.917    8.09 |  2.67    4.96
               0.500    8.87 | 1.250   23.91 | 2.000    8.09 |  2.75    4.54
               0.583   14.04 | 1.333   23.91 | 2.083    6.97 |  2.83    4.54
               0.667   14.04 | 1.417   16.05 | 2.167    6.97 |  2.92    4.19
               0.750   34.63 | 1.500   16.05 | 2.250    6.13 |  3.00    4.19

    Unit Hyd Qpeak  (cms)=   0.441

    PEAK FLOW       (cms)=   0.112 (i)
    TIME TO PEAK    (hrs)=   1.083
    RUNOFF VOLUME    (mm)=  19.586
    TOTAL RAINFALL   (mm)=  56.506
    RUNOFF COEFFICIENT   =   0.347

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0024)|   Area    (ha)=   7.57   Curve Number   (CN)= 70.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.22   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                           ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.21 | 0.833   34.63 | 1.583   12.06 |  2.33    6.13
               0.167    5.21 | 0.917  122.29 | 1.667   12.06 |  2.42    5.48
               0.250    6.54 | 1.000  122.29 | 1.750    9.68 |  2.50    5.48
               0.333    6.54 | 1.083   45.40 | 1.833    9.68 |  2.58    4.96
               0.417    8.87 | 1.167   45.40 | 1.917    8.09 |  2.67    4.96
               0.500    8.87 | 1.250   23.91 | 2.000    8.09 |  2.75    4.54
               0.583   14.04 | 1.333   23.91 | 2.083    6.97 |  2.83    4.54
               0.667   14.04 | 1.417   16.05 | 2.167    6.97 |  2.92    4.19
```

POST-DEV

0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.302 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 15.970
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.283

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0025) | Area (ha)= 0.17 | Curve Number (CN)= 55.0
ID= 1 DT= 5.0 min | Ia (mm)= 10.00 | # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 8.453
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.150

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0029) | Area (ha)= 2.38
ID= 1 DT= 5.0 min | Total Imp(%)= 37.00 | Dir. Conn.(%)= 18.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.88	1.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.50	2.00
Length	(m)=	125.96	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Max.Eff.Inten.(mm/hr)=		122.29	57.67	
over (min)		5.00	10.00	
Storage Coeff. (min)=		2.06 (ii)	7.86 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.31	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.14	0.18	0.281 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	55.51	22.88	28.75
TOTAL RAINFALL	(mm)=	56.51	56.51	56.51

POST-DEV

```
     RUNOFF COEFFICIENT   =       0.98         0.40           0.51

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0035)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1983      0.0342
                          0.0082      0.0019   |    0.2310      0.0374
                          0.0179      0.0038   |    0.2593      0.0402
                          0.0240      0.0074   |    0.2846      0.0425
                          0.0288      0.0115   |    0.3076      0.0444
                          0.0330      0.0156   |    0.3290      0.0463
                          0.0399      0.0195   |    0.3490      0.0482
                          0.0777      0.0234   |    0.3538      0.0487
                          0.0928      0.0272   |    0.3586      0.0491
                          0.1574      0.0308   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)      2.380      0.281      1.00      28.75
   OUTFLOW: ID= 1 (  0035)      2.380      0.119      1.42      28.73
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.45
                  TIME SHIFT OF PEAK FLOW         (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0288

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):     7.57   0.302     1.33    15.97
     + ID2= 2 (  0025):     0.17   0.005     1.17     8.45
       ================================================
       ID = 3 (  0021):     7.74   0.305     1.33    15.81

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0021):     7.74   0.305     1.33    15.81
     + ID2= 2 (  0035):     2.38   0.119     1.42    28.73
       ================================================
       ID = 1 (  0021):    10.12   0.423     1.33    18.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):    10.12   0.423     1.33    18.84
     + ID2= 2 (  0007):     1.50   0.112     1.08    19.59
       ================================================
       ID = 3 (  0021):    11.62   0.492     1.33    18.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
```

POST-DEV

---------- U.H. Tp(hrs)= 0.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.184 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 15.300
TOTAL RAINFALL (mm)= 56.506
RUNOFF COEFFICIENT = 0.271

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0003) ID= 1 DT= 5.0 min	Area (ha)= 0.26 Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

				TOTALS
Max.Eff.Inten.(mm/hr)=		122.29	29.67	
over (min)		5.00	15.00	
Storage Coeff. (min)=		1.39 (ii)	13.21 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.33	0.08	
PEAK FLOW	(cms)=	0.04	0.01	0.043 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.00
RUNOFF VOLUME	(mm)=	55.51	18.85	35.31
TOTAL RAINFALL	(mm)=	56.51	56.51	56.51
RUNOFF COEFFICIENT	=	0.98	0.33	0.62

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0026) ID= 1 DT= 5.0 min	Area (ha)= 1.07 Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)

POST-DEV

Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Max.Eff.Inten.(mm/hr)=		122.29	45.69	
	over (min)	5.00	15.00	
Storage Coeff.	(min)=	1.31 (ii)	10.55 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.33	0.09	
				TOTALS
PEAK FLOW	(cms)=	0.03	0.07	0.080 (iii)
TIME TO PEAK	(hrs)=	1.00	1.17	1.17
RUNOFF VOLUME	(mm)=	55.51	20.97	23.72
TOTAL RAINFALL	(mm)=	56.51	56.51	56.51
RUNOFF COEFFICIENT	=	0.98	0.37	0.42

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0028)	Area (ha)=	1.82	
ID= 1 DT= 5.0 min	Total Imp(%)=	58.00	Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.06	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	110.15	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	0.833	34.63	1.583	12.06	2.33	6.13
0.167	5.21	0.917	122.29	1.667	12.06	2.42	5.48
0.250	6.54	1.000	122.29	1.750	9.68	2.50	5.48
0.333	6.54	1.083	45.40	1.833	9.68	2.58	4.96
0.417	8.87	1.167	45.40	1.917	8.09	2.67	4.96
0.500	8.87	1.250	23.91	2.000	8.09	2.75	4.54
0.583	14.04	1.333	23.91	2.083	6.97	2.83	4.54
0.667	14.04	1.417	16.05	2.167	6.97	2.92	4.19
0.750	34.63	1.500	16.05	2.250	6.13	3.00	4.19

Max.Eff.Inten.(mm/hr)=		122.29	85.31	
	over (min)	5.00	10.00	
Storage Coeff.	(min)=	2.03 (ii)	6.82 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.31	0.14	
				TOTALS
PEAK FLOW	(cms)=	0.20	0.14	0.309 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	55.51	26.29	35.64
TOTAL RAINFALL	(mm)=	56.51	56.51	56.51
RUNOFF COEFFICIENT	=	0.98	0.47	0.63

POST-DEV

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***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   0.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  23.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.15         0.50
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      65.83        70.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083     5.21 | 0.833    34.63 | 1.583    12.06 |  2.33     6.13
              0.167     5.21 | 0.917   122.29 | 1.667    12.06 |  2.42     5.48
              0.250     6.54 | 1.000   122.29 | 1.750     9.68 |  2.50     5.48
              0.333     6.54 | 1.083    45.40 | 1.833     9.68 |  2.58     4.96
              0.417     8.87 | 1.167    45.40 | 1.917     8.09 |  2.67     4.96
              0.500     8.87 | 1.250    23.91 | 2.000     8.09 |  2.75     4.54
              0.583    14.04 | 1.333    23.91 | 2.083     6.97 |  2.83     4.54
              0.667    14.04 | 1.417    16.05 | 2.167     6.97 |  2.92     4.19
              0.750    34.63 | 1.500    16.05 | 2.250     6.13 |  3.00     4.19

     Max.Eff.Inten.(mm/hr)=     122.29        27.51
               over (min)          5.00        20.00
     Storage Coeff.  (min)=        1.83 (ii)   18.38 (ii)
     Unit Hyd. Tpeak (min)=        5.00        20.00
     Unit Hyd. peak  (cms)=        0.32         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=        0.05         0.02          0.058 (iii)
     TIME TO PEAK    (hrs)=        1.00         1.33           1.00
     RUNOFF VOLUME    (mm)=       55.51        18.85          27.26
     TOTAL RAINFALL   (mm)=       56.51        56.51          56.51
     RUNOFF COEFFICIENT   =        0.98         0.33           0.48

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0016):     2.73   0.184     1.00    15.30
      + ID2= 2 (  0026):     1.07   0.080     1.17    23.72
        ====================================================
        ID = 3 (  0006):     3.80   0.246     1.00    17.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     3.80   0.246     1.00    17.67
      + ID2= 2 (  0028):     1.82   0.309     1.00    35.64
        ====================================================
        ID = 1 (  0006):     5.62   0.555     1.00    23.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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POST-DEV

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| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     5.62   0.555     1.00    23.49
     + ID2= 2 (  0003):     0.26   0.043     1.00    35.31
       ================================================
       ID = 3 (  0006):     5.88   0.598     1.00    24.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     5.88   0.598     1.00    24.01
     + ID2= 2 (  0032):     0.65   0.058     1.00    27.26
       ================================================
       ID = 1 (  0006):     6.53   0.655     1.00    24.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.5446      0.0556
                          0.0188      0.0030   |    0.5959      0.0608
                          0.0389      0.0061   |    0.6429      0.0655
                          0.0617      0.0120   |    0.6866      0.0692
                          0.1336      0.0187   |    0.7276      0.0723
                          0.2029      0.0253   |    0.7663      0.0753
                          0.2300      0.0318   |    0.8032      0.0783
                          0.3432      0.0381   |    0.8122      0.0791
                          0.4224      0.0442   |    0.8210      0.0799
                          0.4877      0.0501   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0006)     6.530      0.655      1.00       24.34
   OUTFLOW: ID= 1 (  0030)     6.530      0.385      1.25       24.33
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00        0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 58.78
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0417

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****************************************
** SIMULATION:D. 25yr 3hr 10min Chicago **
****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1719.500
| Ptotal= 68.68 mm |                          B=  10.000
--------------------                          C=   0.823
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  =  3.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    6.25 |  0.83  146.10 |  1.67   11.80 |  2.50    5.94
                0.17    7.89 |  1.00   56.24 |  1.83    9.82 |  2.67    5.42
                0.33   10.80 |  1.17   29.66 |  2.00    8.42 |  2.83    4.99
                0.50   17.27 |  1.33   19.80 |  2.17    7.38 |
                0.67   42.92 |  1.50   14.79 |  2.33    6.58 |


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--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.50   Curve Number   (CN)= 75.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.83   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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POST-DEV

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.160 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 27.426
TOTAL RAINFALL (mm)= 68.678
RUNOFF COEFFICIENT = 0.399

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0024) | ID= 1 DT= 5.0 min	Area (ha)= 7.57 Curve Number (CN)= 70.2 Ia (mm)= 6.22 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.29

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.441 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 22.878
TOTAL RAINFALL (mm)= 68.678
RUNOFF COEFFICIENT = 0.333

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0025) | ID= 1 DT= 5.0 min	Area (ha)= 0.17 Curve Number (CN)= 55.0 Ia (mm)= 10.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.007 (i)

POST-DEV

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     TIME TO PEAK    (hrs)=   1.167
     RUNOFF VOLUME    (mm)=  12.842
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.187

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0029)|   Area    (ha)=   2.38
|ID= 1 DT= 5.0 min |   Total Imp(%)=  37.00   Dir. Conn.(%)=  18.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.88          1.50
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.50          2.00
     Length            (m)=     125.96         20.00
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
               0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
               0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
               0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
               0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
               0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
               0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
               0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
               0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Max.Eff.Inten.(mm/hr)=     146.10        80.45
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.92 (ii)    6.99 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.26          0.378 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      67.68        31.51          38.02
     TOTAL RAINFALL   (mm)=      68.68        68.68          68.68
     RUNOFF COEFFICIENT   =       0.99         0.46           0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0035)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1983      0.0342
                          0.0082      0.0019   |    0.2310      0.0374
                          0.0179      0.0038   |    0.2593      0.0402
                          0.0240      0.0074   |    0.2846      0.0425
                          0.0288      0.0115   |    0.3076      0.0444
                          0.0330      0.0156   |    0.3290      0.0463
                          0.0399      0.0195   |    0.3490      0.0482
                          0.0777      0.0234   |    0.3538      0.0487
                          0.0928      0.0272   |    0.3586      0.0491
                          0.1574      0.0308   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)     2.380      0.378      1.00      38.02
   OUTFLOW: ID= 1 (  0035)     2.380      0.194      1.33      38.00
   OVERFLOW:ID= 3 (  0003)     0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00
```

POST-DEV

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                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.18
                    TIME SHIFT OF PEAK FLOW          (min)= 20.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  0.0340

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0024):     7.57   0.441     1.33    22.88
      + ID2= 2 (  0025):     0.17   0.007     1.17    12.84
        ================================================
        ID = 3 (  0021):     7.74   0.446     1.33    22.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0021):     7.74   0.446     1.33    22.66
      + ID2= 2 (  0035):     2.38   0.194     1.33    38.00
        ================================================
        ID = 1 (  0021):    10.12   0.640     1.33    26.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0021):    10.12   0.640     1.33    26.27
      + ID2= 2 (  0007):     1.50   0.160     1.08    27.43
        ================================================
        ID = 3 (  0021):    11.62   0.744     1.25    26.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.25 | 0.833   42.92 | 1.583   14.79 |  2.33    7.38
               0.167    6.25 | 0.917  146.10 | 1.667   14.79 |  2.42    6.58
               0.250    7.89 | 1.000  146.10 | 1.750   11.80 |  2.50    6.58
               0.333    7.89 | 1.083   56.24 | 1.833   11.80 |  2.58    5.94
               0.417   10.80 | 1.167   56.24 | 1.917    9.82 |  2.67    5.94
               0.500   10.80 | 1.250   29.66 | 2.000    9.82 |  2.75    5.42
               0.583   17.27 | 1.333   29.66 | 2.083    8.42 |  2.83    5.42
               0.667   17.27 | 1.417   19.80 | 2.167    8.42 |  2.92    4.99
               0.750   42.92 | 1.500   19.80 | 2.250    7.38 |  3.00    4.99

     Unit Hyd Qpeak  (cms)=   1.159

     PEAK FLOW       (cms)=   0.271 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=  21.959
     TOTAL RAINFALL   (mm)=  68.678
     RUNOFF COEFFICIENT   =   0.320

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0003)|   Area    (ha)=   0.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  45.00   Dir. Conn.(%)=  45.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.12          0.14
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
```

POST-DEV

Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Max.Eff.Inten.(mm/hr)=	146.10	49.82		
over (min)	5.00	15.00		
Storage Coeff. (min)=	1.30 (ii)	10.90 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.33	0.09		
			TOTALS	
PEAK FLOW (cms)=	0.05	0.01	0.053 (iii)	
TIME TO PEAK (hrs)=	1.00	1.17	1.00	
RUNOFF VOLUME (mm)=	67.68	26.52	45.02	
TOTAL RAINFALL (mm)=	68.68	68.68	68.68	
RUNOFF COEFFICIENT =	0.99	0.39	0.66	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0026)	Area (ha)=	1.07	
ID= 1 DT= 5.0 min	Total Imp(%)=	20.00	Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

Max.Eff.Inten.(mm/hr)=	146.10	64.51		
over (min)	5.00	10.00		
Storage Coeff. (min)=	1.22 (ii)	9.27 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.33	0.12		
			TOTALS	
PEAK FLOW (cms)=	0.03	0.11	0.120 (iii)	
TIME TO PEAK (hrs)=	1.00	1.08	1.08	
RUNOFF VOLUME (mm)=	67.68	29.16	32.23	
TOTAL RAINFALL (mm)=	68.68	68.68	68.68	
RUNOFF COEFFICIENT =	0.99	0.42	0.47	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

POST-DEV

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0028)	Area (ha)= 1.82
ID= 1 DT= 5.0 min	Total Imp(%)= 58.00 Dir. Conn.(%)= 32.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.06	0.76
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.00	2.00
Length	(m)=	110.15	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

				TOTALS
Max.Eff.Inten.(mm/hr)=		146.10	116.72	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.89 (ii)	6.35 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.32	0.15	
PEAK FLOW	(cms)=	0.24	0.20	0.397 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	67.68	35.64	45.89
TOTAL RAINFALL	(mm)=	68.68	68.68	68.68
RUNOFF COEFFICIENT	=	0.99	0.52	0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0032)	Area (ha)= 0.65
ID= 1 DT= 5.0 min	Total Imp(%)= 23.00 Dir. Conn.(%)= 23.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.15	0.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	65.83	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.25	0.833	42.92	1.583	14.79	2.33	7.38
0.167	6.25	0.917	146.10	1.667	14.79	2.42	6.58
0.250	7.89	1.000	146.10	1.750	11.80	2.50	6.58
0.333	7.89	1.083	56.24	1.833	11.80	2.58	5.94
0.417	10.80	1.167	56.24	1.917	9.82	2.67	5.94
0.500	10.80	1.250	29.66	2.000	9.82	2.75	5.42
0.583	17.27	1.333	29.66	2.083	8.42	2.83	5.42
0.667	17.27	1.417	19.80	2.167	8.42	2.92	4.99
0.750	42.92	1.500	19.80	2.250	7.38	3.00	4.99

POST-DEV

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     Max.Eff.Inten.(mm/hr)=     146.10        42.42
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       1.71 (ii)   15.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.32         0.07
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.04          0.072 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.25           1.00
     RUNOFF VOLUME    (mm)=      67.68        26.52          35.97
     TOTAL RAINFALL   (mm)=      68.68        68.68          68.68
     RUNOFF COEFFICIENT   =       0.99         0.39           0.52

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0016):     2.73   0.271     1.00    21.96
     + ID2= 2 (  0026):     1.07   0.120     1.08    32.23
       ================================================
       ID = 3 (  0006):     3.80   0.386     1.00    24.85

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     3.80   0.386     1.00    24.85
     + ID2= 2 (  0028):     1.82   0.397     1.00    45.89
       ================================================
       ID = 1 (  0006):     5.62   0.783     1.00    31.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     5.62   0.783     1.00    31.66
     + ID2= 2 (  0003):     0.26   0.053     1.00    45.02
       ================================================
       ID = 3 (  0006):     5.88   0.836     1.00    32.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     5.88   0.836     1.00    32.26
     + ID2= 2 (  0032):     0.65   0.072     1.00    35.97
       ================================================
       ID = 1 (  0006):     6.53   0.908     1.00    32.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000      0.0000   |    0.5446      0.0556
                         0.0188      0.0030   |    0.5959      0.0608
                         0.0389      0.0061   |    0.6429      0.0655
                         0.0617      0.0120   |    0.6866      0.0692
                         0.1336      0.0187   |    0.7276      0.0723
                         0.2029      0.0253   |    0.7663      0.0753
                         0.2300      0.0318   |    0.8032      0.0783
                         0.3432      0.0381   |    0.8122      0.0791
                         0.4224      0.0442   |    0.8210      0.0799
                         0.4877      0.0501   |    0.0000      0.0000
```

POST-DEV

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0006)	6.530	0.908	1.00	32.62
OUTFLOW: ID= 1 (0030)	6.530	0.537	1.25	32.62
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 59.13
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= 0.0555

****
** SIMULATION:E. 50yr 3hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 76.86 mm

IDF curve parameters: A=1954.800
B= 10.000
C= 0.826
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.91	0.83	164.61	1.67	13.11	2.50	6.57
0.17	8.74	1.00	63.07	1.83	10.90	2.67	5.99
0.33	11.99	1.17	33.14	2.00	9.34	2.83	5.51
0.50	19.23	1.33	22.06	2.17	8.17		
0.67	48.07	1.50	16.45	2.33	7.28		

CALIB NASHYD (0007) | ID= 1 DT= 5.0 min	Area (ha)= 1.50	Curve Number (CN)= 75.3
	Ia (mm)= 4.83	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.13	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.196 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 33.065
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.430

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0024) | ID= 1 DT= 5.0 min	Area (ha)= 7.57	Curve Number (CN)= 70.2
	Ia (mm)= 6.22	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.29	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

POST-DEV

0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.546 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 27.922
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.363

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
NASHYD (0025)
ID= 1 DT= 5.0 min

Area (ha)= 0.17 Curve Number (CN)= 55.0
Ia (mm)= 10.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.009 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 16.178
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.210

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB
STANDHYD (0029)
ID= 1 DT= 5.0 min

Area (ha)= 2.38
Total Imp(%)= 37.00 Dir. Conn.(%)= 18.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.88	1.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.50	2.00
Length	(m)=	125.96	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Max.Eff.Inten.(mm/hr)=		164.61	98.45
over (min)		5.00	10.00

POST-DEV

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     Storage Coeff.  (min)=       1.83 (ii)    6.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.20         0.32          0.457 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      75.86        37.66          44.53
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.49           0.58

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0035)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1983      0.0342
                          0.0082      0.0019   |    0.2310      0.0374
                          0.0179      0.0038   |    0.2593      0.0402
                          0.0240      0.0074   |    0.2846      0.0425
                          0.0288      0.0115   |    0.3076      0.0444
                          0.0330      0.0156   |    0.3290      0.0463
                          0.0399      0.0195   |    0.3490      0.0482
                          0.0777      0.0234   |    0.3538      0.0487
                          0.0928      0.0272   |    0.3586      0.0491
                          0.1574      0.0308   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)      2.380      0.457      1.00      44.53
   OUTFLOW: ID= 1 (  0035)      2.380      0.238      1.25      44.51
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 52.20
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0385

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):      7.57   0.546     1.33    27.92
     + ID2= 2 (  0025):      0.17   0.009     1.17    16.18
       ================================================
       ID = 3 (  0021):      7.74   0.554     1.33    27.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0021):      7.74   0.554     1.33    27.66
     + ID2= 2 (  0035):      2.38   0.238     1.25    44.51
       ================================================
       ID = 1 (  0021):     10.12   0.791     1.33    31.63

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     10.12   0.791     1.33    31.63
     + ID2= 2 (  0007):      1.50   0.196     1.08    33.06
       ================================================
```

POST-DEV

ID = 3 (0021): 11.62 0.925 1.25 31.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0016)	Area (ha)=	2.73	Curve Number (CN)= 70.3
ID= 1 DT= 5.0 min	Ia (mm)=	6.53	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.09	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.341 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 26.823
TOTAL RAINFALL (mm)= 76.857
RUNOFF COEFFICIENT = 0.349

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0003)	Area (ha)=	0.26	
ID= 1 DT= 5.0 min	Total Imp(%)=	45.00	Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.91	0.833	48.07	1.583	16.45	2.33	8.17
0.167	6.91	0.917	164.61	1.667	16.45	2.42	7.28
0.250	8.74	1.000	164.61	1.750	13.11	2.50	7.28
0.333	8.74	1.083	63.07	1.833	13.11	2.58	6.57
0.417	11.99	1.167	63.07	1.917	10.90	2.67	6.57
0.500	11.99	1.250	33.14	2.000	10.90	2.75	5.99
0.583	19.23	1.333	33.14	2.083	9.34	2.83	5.99
0.667	19.23	1.417	22.06	2.167	9.34	2.92	5.51
0.750	48.07	1.500	22.06	2.250	8.17	3.00	5.51

				TOTALS
Max.Eff.Inten.(mm/hr)=		164.61	61.86	
	over (min)	5.00	15.00	
Storage Coeff. (min)=		1.24 (ii)	10.04 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.33	0.10	
PEAK FLOW (cms)=		0.05	0.02	0.061 (iii)
TIME TO PEAK (hrs)=		1.00	1.17	1.00
RUNOFF VOLUME (mm)=		75.86	32.05	51.74
TOTAL RAINFALL (mm)=		76.86	76.86	76.86
RUNOFF COEFFICIENT =		0.99	0.42	0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

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--------------------
| CALIB              |
| STANDHYD (  0026)|   Area    (ha)=   1.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  20.00   Dir. Conn.(%)=   8.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.21          0.86
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       5.00          7.10
     Length            (m)=      84.46         70.00
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Max.Eff.Inten.(mm/hr)=     164.61        79.46
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.17 (ii)    8.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.13          0.150 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.08
     RUNOFF VOLUME    (mm)=      75.86        35.02          38.29
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.46           0.50

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0028)|   Area    (ha)=   1.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  32.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.06          0.76
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     110.15         20.00
     Mannings n           =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Max.Eff.Inten.(mm/hr)=     164.61       141.28
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.80 (ii)    6.05 (ii)
```

POST-DEV

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     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.27         0.24          0.466 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      75.86        42.22          52.98
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.55           0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   0.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  23.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.15         0.50
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      65.83        70.00
     Mannings n             =    0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.91 | 0.833   48.07 | 1.583   16.45 |  2.33    8.17
              0.167    6.91 | 0.917  164.61 | 1.667   16.45 |  2.42    7.28
              0.250    8.74 | 1.000  164.61 | 1.750   13.11 |  2.50    7.28
              0.333    8.74 | 1.083   63.07 | 1.833   13.11 |  2.58    6.57
              0.417   11.99 | 1.167   63.07 | 1.917   10.90 |  2.67    6.57
              0.500   11.99 | 1.250   33.14 | 2.000   10.90 |  2.75    5.99
              0.583   19.23 | 1.333   33.14 | 2.083    9.34 |  2.83    5.99
              0.667   19.23 | 1.417   22.06 | 2.167    9.34 |  2.92    5.51
              0.750   48.07 | 1.500   22.06 | 2.250    8.17 |  3.00    5.51

     Max.Eff.Inten.(mm/hr)=     164.61        52.37
               over (min)          5.00        15.00
     Storage Coeff.  (min)=       1.63 (ii)   14.42 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.32         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.05          0.090 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      75.86        32.05          42.11
     TOTAL RAINFALL   (mm)=      76.86        76.86          76.86
     RUNOFF COEFFICIENT   =       0.99         0.42           0.55

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0016):     2.73   0.341     1.00    26.82
      + ID2= 2 (  0026):     1.07   0.150     1.08    38.29
        ==========================================================
        ID = 3 (  0006):     3.80   0.484     1.00    30.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
```

POST-DEV

```
       ID1= 3 (  0006):     3.80   0.484     1.00    30.05
     + ID2= 2 (  0028):     1.82   0.466     1.00    52.98
       ================================================
       ID = 1 (  0006):     5.62   0.950     1.00    37.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0006):     5.62   0.950     1.00    37.48
     + ID2= 2 (  0003):     0.26   0.061     1.00    51.74
       ================================================
       ID = 3 (  0006):     5.88   1.011     1.00    38.11

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0006):     5.88   1.011     1.00    38.11
     + ID2= 2 (  0032):     0.65   0.090     1.00    42.11
       ================================================
       ID = 1 (  0006):     6.53   1.102     1.00    38.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                           0.0000      0.0000   |    0.5446      0.0556
                           0.0188      0.0030   |    0.5959      0.0608
                           0.0389      0.0061   |    0.6429      0.0655
                           0.0617      0.0120   |    0.6866      0.0692
                           0.1336      0.0187   |    0.7276      0.0723
                           0.2029      0.0253   |    0.7663      0.0753
                           0.2300      0.0318   |    0.8032      0.0783
                           0.3432      0.0381   |    0.8122      0.0791
                           0.4224      0.0442   |    0.8210      0.0799
                           0.4877      0.0501   |    0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0006)      6.530      1.102      1.00      38.51
   OUTFLOW: ID= 1 (  0030)      6.530      0.643      1.25      38.50
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 58.39
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0663

--------------------------------------------------------------------------------
*****************************************
** SIMULATION:F. 100yr 3hr 10min Chicago **
*****************************************
--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2317.400
| Ptotal= 86.08 mm |                          B=  11.000
--------------------                          C=   0.836
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  3.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00     7.60 |  0.83   181.81 |  1.67    14.69 |  2.50     7.21
                0.17     9.69 |  1.00    71.90 |  1.83    12.15 |  2.67     6.56
                0.33    13.40 |  1.17    37.82 |  2.00    10.36 |  2.83     6.01
                0.50    21.77 |  1.33    25.04 |  2.17     9.04 |
                0.67    54.83 |  1.50    18.55 |  2.33     8.02 |
```

POST-DEV

CALIB					
NASHYD (0007)	Area (ha)=	1.50	Curve Number (CN)=	75.3	
ID= 1 DT= 5.0 min	Ia (mm)=	4.83	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.13			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.237 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 39.715
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.461

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0024)	Area (ha)=	7.57	Curve Number (CN)=	70.2	
ID= 1 DT= 5.0 min	Ia (mm)=	6.22	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.29			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 0.671 (i)
TIME TO PEAK (hrs)= 1.333
RUNOFF VOLUME (mm)= 33.935
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.394

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0025)	Area (ha)=	0.17	Curve Number (CN)=	55.0	
ID= 1 DT= 5.0 min	Ia (mm)=	10.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.15			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21

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0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.167
RUNOFF VOLUME (mm)= 20.267
TOTAL RAINFALL (mm)= 86.077
RUNOFF COEFFICIENT = 0.235

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0029)	Area (ha)= 2.38
ID= 1 DT= 5.0 min	Total Imp(%)= 37.00 Dir. Conn.(%)= 18.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.88	1.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.50	2.00
Length	(m)=	125.96	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

Max.Eff.Inten.(mm/hr)=		181.81	117.36	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.75 (ii)	6.12 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.32	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.22	0.39	0.540 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	85.08	44.85	52.09
TOTAL RAINFALL	(mm)=	86.08	86.08	86.08
RUNOFF COEFFICIENT	=	0.99	0.52	0.61

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0035)	OVERFLOW IS ON
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.1983	0.0342
0.0082	0.0019	0.2310	0.0374
0.0179	0.0038	0.2593	0.0402
0.0240	0.0074	0.2846	0.0425
0.0288	0.0115	0.3076	0.0444
0.0330	0.0156	0.3290	0.0463
0.0399	0.0195	0.3490	0.0482
0.0777	0.0234	0.3538	0.0487
0.0928	0.0272	0.3586	0.0491
0.1574	0.0308	0.0000	0.0000

	AREA	QPEAK	TPEAK	R.V.

POST-DEV

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                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0029)      2.380     0.540     1.00       52.09
   OUTFLOW: ID= 1 (  0035)      2.380     0.293     1.25       52.06
   OVERFLOW:ID= 3 (  0003)      0.000     0.000     0.00        0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 54.31
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0435

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--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0024):      7.57   0.671     1.33     33.94
     + ID2= 2 (  0025):      0.17   0.012     1.17     20.27
       ================================================
       ID = 3 (  0021):      7.74   0.680     1.33     33.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0021)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0021):      7.74   0.680     1.33     33.64
     + ID2= 2 (  0035):      2.38   0.293     1.25     52.06
       ================================================
       ID = 1 (  0021):     10.12   0.968     1.33     37.97

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0021):     10.12   0.968     1.33     37.97
     + ID2= 2 (  0007):      1.50   0.237     1.08     39.71
       ================================================
       ID = 3 (  0021):     11.62   1.135     1.25     38.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   2.73   Curve Number   (CN)= 70.3
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    7.60 | 0.833   54.83 | 1.583   18.55 |  2.33    9.04
               0.167    7.60 | 0.917  181.81 | 1.667   18.55 |  2.42    8.02
               0.250    9.69 | 1.000  181.81 | 1.750   14.69 |  2.50    8.02
               0.333    9.69 | 1.083   71.90 | 1.833   14.69 |  2.58    7.21
               0.417   13.40 | 1.167   71.90 | 1.917   12.15 |  2.67    7.21
               0.500   13.40 | 1.250   37.82 | 2.000   12.15 |  2.75    6.56
               0.583   21.77 | 1.333   37.82 | 2.083   10.36 |  2.83    6.56
               0.667   21.77 | 1.417   25.04 | 2.167   10.36 |  2.92    6.01
               0.750   54.83 | 1.500   25.04 | 2.250    9.04 |  3.00    6.01

     Unit Hyd Qpeak  (cms)=   1.159

     PEAK FLOW       (cms)=   0.417 (i)
     TIME TO PEAK    (hrs)=   1.000
     RUNOFF VOLUME    (mm)=  32.621
     TOTAL RAINFALL   (mm)=  86.077
     RUNOFF COEFFICIENT   =   0.379

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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POST-DEV

CALIB	
STANDHYD (0003)	Area (ha)= 0.26
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

				TOTALS
Max.Eff.Inten.(mm/hr)=		181.81	74.74	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.19 (ii)	9.35 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.33	0.12	
PEAK FLOW	(cms)=	0.06	0.02	0.075 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.00
RUNOFF VOLUME	(mm)=	85.08	38.59	59.49
TOTAL RAINFALL	(mm)=	86.08	86.08	86.08
RUNOFF COEFFICIENT	=	0.99	0.45	0.69

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	7.60	0.833	54.83	1.583	18.55	2.33	9.04
0.167	7.60	0.917	181.81	1.667	18.55	2.42	8.02
0.250	9.69	1.000	181.81	1.750	14.69	2.50	8.02
0.333	9.69	1.083	71.90	1.833	14.69	2.58	7.21
0.417	13.40	1.167	71.90	1.917	12.15	2.67	7.21
0.500	13.40	1.250	37.82	2.000	12.15	2.75	6.56
0.583	21.77	1.333	37.82	2.083	10.36	2.83	6.56
0.667	21.77	1.417	25.04	2.167	10.36	2.92	6.01
0.750	54.83	1.500	25.04	2.250	9.04	3.00	6.01

				TOTALS
Max.Eff.Inten.(mm/hr)=		181.81	95.31	
over (min)		5.00	10.00	
Storage Coeff. (min)=		1.12 (ii)	8.00 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.34	0.13	
PEAK FLOW	(cms)=	0.04	0.17	0.183 (iii)
TIME TO PEAK	(hrs)=	1.00	1.08	1.08

POST-DEV

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     RUNOFF VOLUME    (mm)=      85.08        41.92          45.37
     TOTAL RAINFALL   (mm)=      86.08        86.08          86.08
     RUNOFF COEFFICIENT   =       0.99         0.49           0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  32.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.06         0.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=     110.15        20.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    7.60 | 0.833   54.83 | 1.583   18.55 |  2.33    9.04
              0.167    7.60 | 0.917  181.81 | 1.667   18.55 |  2.42    8.02
              0.250    9.69 | 1.000  181.81 | 1.750   14.69 |  2.50    8.02
              0.333    9.69 | 1.083   71.90 | 1.833   14.69 |  2.58    7.21
              0.417   13.40 | 1.167   71.90 | 1.917   12.15 |  2.67    7.21
              0.500   13.40 | 1.250   37.82 | 2.000   12.15 |  2.75    6.56
              0.583   21.77 | 1.333   37.82 | 2.083   10.36 |  2.83    6.56
              0.667   21.77 | 1.417   25.04 | 2.167   10.36 |  2.92    6.01
              0.750   54.83 | 1.500   25.04 | 2.250    9.04 |  3.00    6.01

     Max.Eff.Inten.(mm/hr)=     181.81       166.71
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.73 (ii)    5.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.29         0.28          0.536 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.08           1.00
     RUNOFF VOLUME    (mm)=      85.08        49.87          61.13
     TOTAL RAINFALL   (mm)=      86.08        86.08          86.08
     RUNOFF COEFFICIENT   =       0.99         0.58           0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0032)|   Area    (ha)=   0.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  23.00   Dir. Conn.(%)=  23.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.15         0.50
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      65.83        70.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    7.60 | 0.833   54.83 | 1.583   18.55 |  2.33    9.04
              0.167    7.60 | 0.917  181.81 | 1.667   18.55 |  2.42    8.02
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POST-DEV

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              0.250    9.69 | 1.000  181.81 | 1.750   14.69 |  2.50    8.02
              0.333    9.69 | 1.083   71.90 | 1.833   14.69 |  2.58    7.21
              0.417   13.40 | 1.167   71.90 | 1.917   12.15 |  2.67    7.21
              0.500   13.40 | 1.250   37.82 | 2.000   12.15 |  2.75    6.56
              0.583   21.77 | 1.333   37.82 | 2.083   10.36 |  2.83    6.56
              0.667   21.77 | 1.417   25.04 | 2.167   10.36 |  2.92    6.01
              0.750   54.83 | 1.500   25.04 | 2.250    9.04 |  3.00    6.01

     Max.Eff.Inten.(mm/hr)=     181.81        63.38
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       1.57 (ii)   13.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.33         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.06          0.104 (iii)
     TIME TO PEAK    (hrs)=       1.00         1.17           1.00
     RUNOFF VOLUME    (mm)=      85.08        38.59          49.27
     TOTAL RAINFALL   (mm)=      86.08        86.08          86.08
     RUNOFF COEFFICIENT   =       0.99         0.45           0.57

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0016):     2.73   0.417     1.00    32.62
      + ID2= 2 (  0026):     1.07   0.183     1.08    45.37
        ================================================
        ID = 3 (  0006):     3.80   0.591     1.00    36.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     3.80   0.591     1.00    36.21
      + ID2= 2 (  0028):     1.82   0.536     1.00    61.13
        ================================================
        ID = 1 (  0006):     5.62   1.128     1.00    44.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     5.62   1.128     1.00    44.28
      + ID2= 2 (  0003):     0.26   0.075     1.00    59.49
        ================================================
        ID = 3 (  0006):     5.88   1.202     1.00    44.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     5.88   1.202     1.00    44.95
      + ID2= 2 (  0032):     0.65   0.104     1.00    49.27
        ================================================
        ID = 1 (  0006):     6.53   1.306     1.00    45.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000      0.0000   |    0.5446      0.0556
                         0.0188      0.0030   |    0.5959      0.0608
```

POST-DEV

0.0389	0.0061	0.6429	0.0655
0.0617	0.0120	0.6866	0.0692
0.1336	0.0187	0.7276	0.0723
0.2029	0.0253	0.7663	0.0753
0.2300	0.0318	0.8032	0.0783
0.3432	0.0381	0.8122	0.0791
0.4224	0.0442	0.8210	0.0799
0.4877	0.0501	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0006)	6.530	1.306	1.00	45.38
OUTFLOW: ID= 1 (0030)	6.530	0.785	1.25	45.38
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 60.09
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= 0.0780

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*********************************
** SIMULATION:Hazel            **
*********************************

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|    READ STORM    |    Filename: C:\Users\cbuscher\AppD
|                  |              ata\Local\Temp\
|                  |              105a08e8-f462-42ba-868a-c349b36ab4ee\cb8214f4
| Ptotal=424.00 mm |    Comments: Hazel
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	6.00	6.00	13.00	12.00	23.00	18.00	53.00
1.00	6.00	7.00	13.00	13.00	23.00	19.00	53.00
2.00	4.00	8.00	17.00	14.00	13.00	20.00	38.00
3.00	4.00	9.00	17.00	15.00	13.00	21.00	38.00
4.00	6.00	10.00	13.00	16.00	13.00	22.00	13.00
5.00	6.00	11.00	13.00	17.00	13.00	23.00	13.00

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| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.50   Curve Number   (CN)= 88.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   4.83   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.13

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00

POST-DEV

4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.216 (i)
TIME TO PEAK (hrs)= 20.000
RUNOFF VOLUME (mm)= 383.340
TOTAL RAINFALL (mm)= 423.999
RUNOFF COEFFICIENT = 0.904

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB					
NASHYD (0024)	Area (ha)=	7.57	Curve Number (CN)=	84.0	
ID= 1 DT= 5.0 min	Ia (mm)=	6.22	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.29			

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00

POST-DEV

3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Unit Hyd Qpeak (cms)= 0.997

PEAK FLOW (cms)= 1.092 (i)
TIME TO PEAK (hrs)= 20.000
RUNOFF VOLUME (mm)= 374.253
TOTAL RAINFALL (mm)= 423.999
RUNOFF COEFFICIENT = 0.883

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0025)	Area (ha)= 0.17	Curve Number (CN)= 74.0
ID= 1 DT= 5.0 min	Ia (mm)= 10.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.15	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00

POST-DEV

2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Unit Hyd Qpeak (cms)= 0.043

PEAK FLOW (cms)= 0.024 (i)
TIME TO PEAK (hrs)= 20.000
RUNOFF VOLUME (mm)= 338.615
TOTAL RAINFALL (mm)= 423.999
RUNOFF COEFFICIENT = 0.799

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0029)	Area (ha)= 2.38
ID= 1 DT= 5.0 min	Total Imp(%)= 37.00 Dir. Conn.(%)= 18.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.88	1.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	2.50	2.00
Length	(m)=	125.96	20.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00

POST-DEV

0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Max.Eff.Inten.(mm/hr)=	53.00	68.49		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.87 (ii)	8.29 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.28	0.13		
			TOTALS	
PEAK FLOW (cms)=	0.06	0.29	0.348 (iii)	
TIME TO PEAK (hrs)=	19.08	20.00	20.00	
RUNOFF VOLUME (mm)=	423.00	392.89	398.31	
TOTAL RAINFALL (mm)=	424.00	424.00	424.00	
RUNOFF COEFFICIENT =	1.00	0.93	0.94	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 87.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

POST-DEV

(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

DUHYD (0038)				
Inlet Cap.= 0.359				
#of Inlets= 1				
Total(cms)= 0.4	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	2.38	0.35	20.00	398.31
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	2.38	0.35	20.00	398.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR(0035)	OVERFLOW IS ON			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.1983	0.0342
	0.0082	0.0019	0.2310	0.0374
	0.0179	0.0038	0.2593	0.0402
	0.0240	0.0074	0.2846	0.0425
	0.0288	0.0115	0.3076	0.0444
	0.0330	0.0156	0.3290	0.0463
	0.0399	0.0195	0.3490	0.0482
	0.0777	0.0234	0.3538	0.0487
	0.0928	0.0272	0.3586	0.0491
	0.1574	0.0308	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0038)	2.380	0.348	20.00	398.31
OUTFLOW: ID= 1 (0035)	2.380	0.348	20.00	398.29
OVERFLOW:ID= 3 (0003)	0.000	0.000	0.00	0.00

TOTAL NUMBER OF SIMULATION OVERFLOW = 0
CUMULATIVE TIME OF OVERFLOW (HOURS) = 0.00
PERCENTAGE OF TIME OVERFLOWING (%) = 0.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.87
TIME SHIFT OF PEAK FLOW (min)= 0.00
MAXIMUM STORAGE USED (ha.m.)= 0.0481

ADD HYD (0021)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0024):	7.57	1.092	20.00	374.25
+ ID2= 2 (0025):	0.17	0.024	20.00	338.62
ID = 3 (0021):	7.74	1.115	20.00	373.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0021):	7.74	1.115	20.00	373.47
+ ID2= 2 (0035):	2.38	0.348	20.00	398.29
ID = 1 (0021):	10.12	1.463	20.00	379.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

*** W A R N I N G : HYDROGRAPH 0038 <ID= 2> IS DRY.
*** W A R N I N G : HYDROGRAPH 0003 = HYDROGRAPH 0001

ID1= 1 (0021):	10.12	1.463	20.00	379.31
+ ID2= 2 (0038):	0.00	0.000	0.00	0.00
ID = 3 (0021):	10.12	1.463	20.00	379.31

POST-DEV

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0021)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0021):	10.12	1.463	20.00	379.31
	+ ID2= 2 (0007):	1.50	0.216	20.00	383.34
	ID = 1 (0021):	11.62	1.679	20.00	379.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0016)				
ID= 1 DT= 5.0 min	Area (ha)=	2.73	Curve Number (CN)=	85.0
	Ia (mm)=	6.53	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.09		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00

POST-DEV

4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Unit Hyd Qpeak (cms)= 1.159

PEAK FLOW (cms)= 0.381 (i)
TIME TO PEAK (hrs)= 20.000
RUNOFF VOLUME (mm)= 362.759
TOTAL RAINFALL (mm)= 423.999
RUNOFF COEFFICIENT = 0.856

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD (0003)	Area (ha)= 0.26
ID= 1 DT= 5.0 min	Total Imp(%)= 45.00 Dir. Conn.(%)= 45.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.12	0.14
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	41.63	42.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00

POST-DEV

3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Max.Eff.Inten.(mm/hr)=	53.00	52.38	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.95 (ii)	11.36 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.31	0.09	
			TOTALS
PEAK FLOW (cms)=	0.02	0.02	0.038 (iii)
TIME TO PEAK (hrs)=	19.08	20.00	20.00
RUNOFF VOLUME (mm)=	423.00	384.20	401.63
TOTAL RAINFALL (mm)=	424.00	424.00	424.00
RUNOFF COEFFICIENT =	1.00	0.91	0.95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 87.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
STANDHYD (0026)	Area (ha)= 1.07
ID= 1 DT= 5.0 min	Total Imp(%)= 20.00 Dir. Conn.(%)= 8.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.21	0.86
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	5.00	7.10
Length	(m)=	84.46	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00

POST-DEV

1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Max.Eff.Inten.(mm/hr)=	53.00	60.40	
over (min)	5.00	15.00	
Storage Coeff. (min)=	1.84 (ii)	10.10 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.32	0.10	
			TOTALS
PEAK FLOW (cms)=	0.01	0.14	0.156 (iii)
TIME TO PEAK (hrs)=	19.08	20.00	20.00
RUNOFF VOLUME (mm)=	423.00	389.05	391.76
TOTAL RAINFALL (mm)=	424.00	424.00	424.00
RUNOFF COEFFICIENT =	1.00	0.92	0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 87.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

POST-DEV

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| CALIB            |
| STANDHYD (  0028)|   Area    (ha)=   1.82
|ID= 1 DT= 5.0 min |   Total Imp(%)=  58.00   Dir. Conn.(%)=  32.00
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                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.06          0.76
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     110.15         42.00
     Mannings n             =      0.013         0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00
3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00

POST-DEV

5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Max.Eff.Inten.(mm/hr)=	53.00	85.40	
over (min)	5.00	15.00	
Storage Coeff. (min)=	2.83 (ii)	10.58 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.28	0.09	
			TOTALS
PEAK FLOW (cms)=	0.09	0.18	0.267 (iii)
TIME TO PEAK (hrs)=	19.08	20.00	20.00
RUNOFF VOLUME (mm)=	423.00	398.70	406.48
TOTAL RAINFALL (mm)=	424.00	424.00	424.00
RUNOFF COEFFICIENT =	1.00	0.94	0.96

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 87.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (0032)	Area (ha)=	0.65	
ID= 1 DT= 5.0 min	Total Imp(%)=	23.00	Dir. Conn.(%)= 23.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.15	0.50
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	65.83	70.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	6.083	13.00	12.083	23.00	18.08	53.00
0.167	6.00	6.167	13.00	12.167	23.00	18.17	53.00
0.250	6.00	6.250	13.00	12.250	23.00	18.25	53.00
0.333	6.00	6.333	13.00	12.333	23.00	18.33	53.00
0.417	6.00	6.417	13.00	12.417	23.00	18.42	53.00
0.500	6.00	6.500	13.00	12.500	23.00	18.50	53.00
0.583	6.00	6.583	13.00	12.583	23.00	18.58	53.00
0.667	6.00	6.667	13.00	12.667	23.00	18.67	53.00
0.750	6.00	6.750	13.00	12.750	23.00	18.75	53.00
0.833	6.00	6.833	13.00	12.833	23.00	18.83	53.00
0.917	6.00	6.917	13.00	12.917	23.00	18.92	53.00
1.000	6.00	7.000	13.00	13.000	23.00	19.00	53.00
1.083	6.00	7.083	13.00	13.083	23.00	19.08	53.00
1.167	6.00	7.167	13.00	13.167	23.00	19.17	53.00
1.250	6.00	7.250	13.00	13.250	23.00	19.25	53.00
1.333	6.00	7.333	13.00	13.333	23.00	19.33	53.00
1.417	6.00	7.417	13.00	13.417	23.00	19.42	53.00
1.500	6.00	7.500	13.00	13.500	23.00	19.50	53.00
1.583	6.00	7.583	13.00	13.583	23.00	19.58	53.00
1.667	6.00	7.667	13.00	13.667	23.00	19.67	53.00
1.750	6.00	7.750	13.00	13.750	23.00	19.75	53.00
1.833	6.00	7.833	13.00	13.833	23.00	19.83	53.00
1.917	6.00	7.917	13.00	13.917	23.00	19.92	53.00
2.000	6.00	8.000	13.00	14.000	23.00	20.00	53.00
2.083	4.00	8.083	17.00	14.083	13.00	20.08	38.00
2.167	4.00	8.167	17.00	14.167	13.00	20.17	38.00
2.250	4.00	8.250	17.00	14.250	13.00	20.25	38.00
2.333	4.00	8.333	17.00	14.333	13.00	20.33	38.00
2.417	4.00	8.417	17.00	14.417	13.00	20.42	38.00
2.500	4.00	8.500	17.00	14.500	13.00	20.50	38.00
2.583	4.00	8.583	17.00	14.583	13.00	20.58	38.00
2.667	4.00	8.667	17.00	14.667	13.00	20.67	38.00
2.750	4.00	8.750	17.00	14.750	13.00	20.75	38.00
2.833	4.00	8.833	17.00	14.833	13.00	20.83	38.00
2.917	4.00	8.917	17.00	14.917	13.00	20.92	38.00
3.000	4.00	9.000	17.00	15.000	13.00	21.00	38.00
3.083	4.00	9.083	17.00	15.083	13.00	21.08	38.00
3.167	4.00	9.167	17.00	15.167	13.00	21.17	38.00

POST-DEV

3.250	4.00	9.250	17.00	15.250	13.00	21.25	38.00
3.333	4.00	9.333	17.00	15.333	13.00	21.33	38.00
3.417	4.00	9.417	17.00	15.417	13.00	21.42	38.00
3.500	4.00	9.500	17.00	15.500	13.00	21.50	38.00
3.583	4.00	9.583	17.00	15.583	13.00	21.58	38.00
3.667	4.00	9.667	17.00	15.667	13.00	21.67	38.00
3.750	4.00	9.750	17.00	15.750	13.00	21.75	38.00
3.833	4.00	9.833	17.00	15.833	13.00	21.83	38.00
3.917	4.00	9.917	17.00	15.917	13.00	21.92	38.00
4.000	4.00	10.000	17.00	16.000	13.00	22.00	37.99
4.083	6.00	10.083	13.00	16.083	13.00	22.08	13.00
4.167	6.00	10.167	13.00	16.167	13.00	22.17	13.00
4.250	6.00	10.250	13.00	16.250	13.00	22.25	13.00
4.333	6.00	10.333	13.00	16.333	13.00	22.33	13.00
4.417	6.00	10.417	13.00	16.417	13.00	22.42	13.00
4.500	6.00	10.500	13.00	16.500	13.00	22.50	13.00
4.583	6.00	10.583	13.00	16.583	13.00	22.58	13.00
4.667	6.00	10.667	13.00	16.667	13.00	22.67	13.00
4.750	6.00	10.750	13.00	16.750	13.00	22.75	13.00
4.833	6.00	10.833	13.00	16.833	13.00	22.83	13.00
4.917	6.00	10.917	13.00	16.917	13.00	22.92	13.00
5.000	6.00	11.000	13.00	17.000	13.00	23.00	13.00
5.083	6.00	11.083	13.00	17.083	13.00	23.08	13.00
5.167	6.00	11.167	13.00	17.167	13.00	23.17	13.00
5.250	6.00	11.250	13.00	17.250	13.00	23.25	13.00
5.333	6.00	11.333	13.00	17.333	13.00	23.33	13.00
5.417	6.00	11.417	13.00	17.417	13.00	23.42	13.00
5.500	6.00	11.500	13.00	17.500	13.00	23.50	13.00
5.583	6.00	11.583	13.00	17.583	13.00	23.58	13.00
5.667	6.00	11.667	13.00	17.667	13.00	23.67	13.00
5.750	6.00	11.750	13.00	17.750	13.00	23.75	13.00
5.833	6.00	11.833	13.00	17.833	13.00	23.83	13.00
5.917	6.00	11.917	13.00	17.917	13.00	23.92	13.00
6.000	6.00	12.000	13.00	18.000	13.00	24.00	12.99

Max.Eff.Inten.(mm/hr)=	53.00	52.37	
over (min)	5.00	20.00	
Storage Coeff. (min)=	2.56 (ii)	15.35 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.29	0.07	
			TOTALS
PEAK FLOW (cms)=	0.02	0.07	0.095 (iii)
TIME TO PEAK (hrs)=	19.08	20.00	20.00
RUNOFF VOLUME (mm)=	423.00	384.20	393.11
TOTAL RAINFALL (mm)=	424.00	424.00	424.00
RUNOFF COEFFICIENT =	1.00	0.91	0.93

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 87.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0006)					
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 (0016):	2.73	0.381	20.00	362.76	
+ ID2= 2 (0026):	1.07	0.156	20.00	391.76	
ID = 3 (0006):	3.80	0.537	20.00	370.93	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)					
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
	(ha)	(cms)	(hrs)	(mm)	
ID1= 3 (0006):	3.80	0.537	20.00	370.93	
+ ID2= 2 (0028):	1.82	0.267	20.00	406.48	
ID = 1 (0006):	5.62	0.804	20.00	382.44	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0006)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.

POST-DEV

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--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0006):     5.62   0.804    20.00   382.44
      + ID2= 2 (  0003):     0.26   0.038    20.00   401.63
        ================================================
        ID = 3 (  0006):     5.88   0.842    20.00   383.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0006)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0006):     5.88   0.842    20.00   383.29
      + ID2= 2 (  0032):     0.65   0.095    20.00   393.11
        ================================================
        ID = 1 (  0006):     6.53   0.936    20.00   384.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| DUHYD    (  0036)|
| Inlet Cap.= 0.821|
| #of Inlets=     1|
| Total(cms)=   0.8|       AREA     QPEAK     TPEAK     R.V.
--------------------       (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   6.53      0.94     20.00   384.26
     ================================================
     MAJOR SYS.(ID= 2):   0.16      0.12     20.00   384.26
     MINOR SYS.(ID= 3):   6.37      0.82     18.33   384.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0030)|     OVERFLOW IS ON
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)    |    (cms)     (ha.m.)
                           0.0000      0.0000    |     0.5446      0.0556
                           0.0188      0.0030    |     0.5959      0.0608
                           0.0389      0.0061    |     0.6429      0.0655
                           0.0617      0.0120    |     0.6866      0.0692
                           0.1336      0.0187    |     0.7276      0.0723
                           0.2029      0.0253    |     0.7663      0.0753
                           0.2300      0.0318    |     0.8032      0.0783
                           0.3432      0.0381    |     0.8122      0.0791
                           0.4224      0.0442    |     0.8210      0.0799
                           0.4877      0.0501    |     0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0036)      6.368      0.821     18.33     384.26
   OUTFLOW: ID= 1 (  0030)      6.368      0.821     20.08     384.26
   OVERFLOW:ID= 3 (  0003)      0.000      0.000      0.00       0.00

                  TOTAL NUMBER OF SIMULATION OVERFLOW  =     0
                  CUMULATIVE TIME OF OVERFLOW  (HOURS) =  0.00
                  PERCENTAGE OF TIME OVERFLOWING   (%) =  0.00

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 99.98
                  TIME SHIFT OF PEAK FLOW         (min)=105.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0798

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0037)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0030):     6.37   0.821    20.08   384.26
      + ID2= 2 (  0036):     0.16   0.115    20.00   384.26
        ================================================
        ID = 3 (  0037):     6.53   0.936    20.00   384.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
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APPENDIX H

Stormwater Management Facility Calculations

CROZIER
CONSULTING ENGINEERS

Project:	Ancaster Townhouse
Project No.:	2736-7210
File:	
Design by:	C.Buscher
Date:	2024.11.27
Updated:	

Ancanster Townhouse North Tank SSD

Pond Stage - Storage - Discharge Calculations

E.D. Orifice Diameter:	0.150	m
E.D. Orifice Invert Elevation:	205.00	m
Secondary Orifice Diameter:	0.375	m
Secondary Orifice Elevation:	205.60	m

Elev. (m)	Storage Volume (cu.m)	Depth Above E.D. Invert (m)	ED Orifice Discharge (cu.m/s)	Depth Above Secondary Invert (m)	Secondary Discharge (cu.m/s)	Total Discharge (cu.m/s)	Storage (ha-m)
205.00	0	0.00	0.0000	0.00	0.0000	0.0000	0.000
205.05	9	0.05	0.0044	0.00	0.0000	0.0044	0.001
205.10	19	0.10	0.0082	0.00	0.0000	0.0082	0.002
205.15	28	0.15	0.0139	0.00	0.0000	0.0139	0.003
205.20	38	0.20	0.0179	0.00	0.0000	0.0179	0.004
205.25	53	0.25	0.0212	0.00	0.0000	0.0212	0.005
205.30	74	0.30	0.0240	0.00	0.0000	0.0240	0.007
205.36	94	0.36	0.0265	0.00	0.0000	0.0265	0.009
205.41	115	0.41	0.0288	0.00	0.0000	0.0288	0.012
205.46	135	0.46	0.0310	0.00	0.0000	0.0310	0.014
205.51	156	0.51	0.0330	0.00	0.0000	0.0330	0.016
205.56	176	0.56	0.0348	0.00	0.0000	0.0348	0.018
205.61	195	0.61	0.0366	0.01	0.0033	0.0399	0.020
205.66	215	0.66	0.0383	0.06	0.0205	0.0588	0.021
205.71	234	0.71	0.0400	0.11	0.0377	0.0776	0.023
205.76	253	0.76	0.0415	0.16	0.0549	0.0964	0.025
205.81	272	0.81	0.0430	0.21	0.0498	0.0928	0.027
205.86	290	0.86	0.0445	0.26	0.0864	0.1309	0.029
205.91	308	0.91	0.0459	0.31	0.1115	0.1574	0.031
205.97	325	0.97	0.0473	0.37	0.1320	0.1793	0.033
206.02	342	1.02	0.0486	0.42	0.1497	0.1983	0.034
206.07	358	1.07	0.0499	0.47	0.1655	0.2154	0.036
206.12	374	1.12	0.0512	0.52	0.1799	0.2310	0.037
206.17	389	1.17	0.0524	0.57	0.1932	0.2456	0.039
206.22	402	1.22	0.0536	0.62	0.2057	0.2593	0.040
206.27	414	1.27	0.0548	0.67	0.2175	0.2722	0.041
206.32	425	1.32	0.0559	0.72	0.2286	0.2846	0.043
206.37	435	1.37	0.0570	0.77	0.2393	0.2963	0.043
206.42	444	1.42	0.0582	0.82	0.2495	0.3076	0.044
206.47	454	1.47	0.0592	0.87	0.2593	0.3185	0.045
206.52	463	1.52	0.0603	0.92	0.2687	0.3290	0.046
206.57	473	1.57	0.0614	0.97	0.2778	0.3392	0.047
206.63	482	1.63	0.0624	1.03	0.2866	0.3490	0.048
206.65	487	1.65	0.0629	1.05	0.2909	0.3538	0.049
206.68	491	1.68	0.0634	1.08	0.2952	0.3586	0.049

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	North Tank
Engineer:	Charles Buscher
Project Location:	New York
Measurement Type:	Metric
Required Storage Volume:	700.00 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Design Constraint Dimensions:	(20.01 m. x 35.01 m.)

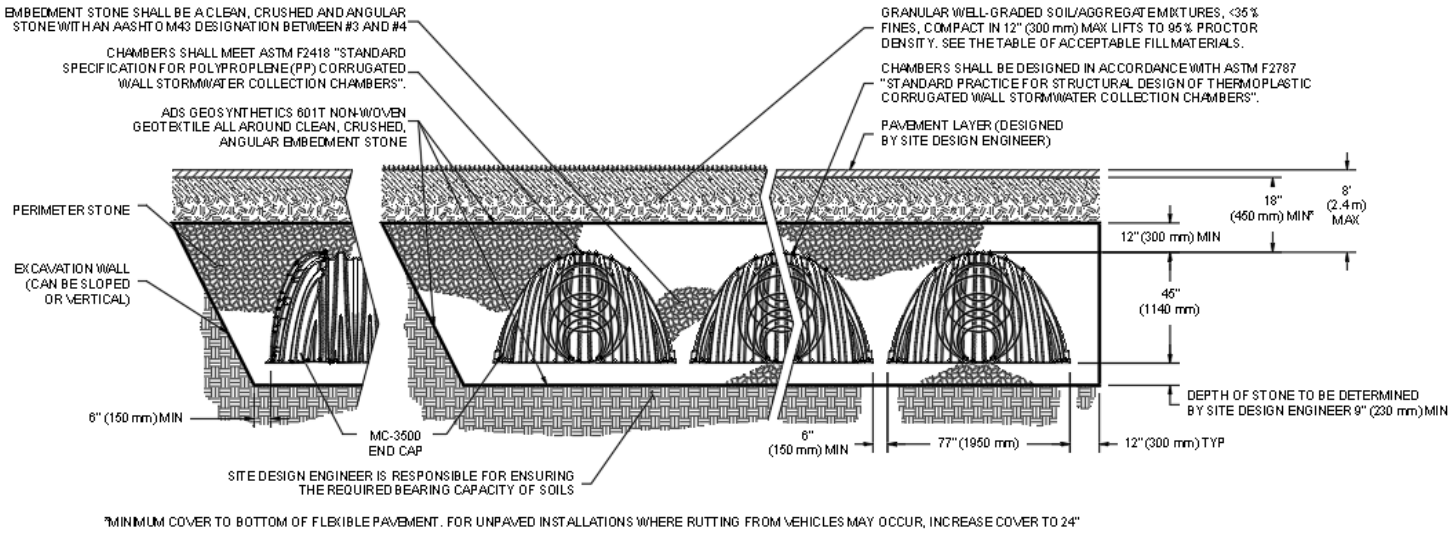
Results

System Volume and Bed Size

Installed Storage Volume:	508.15 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	94
Number Of End Caps Required:	20
Chamber Rows:	10
Maximum Length:	29.23 m.
Maximum Width:	21.54 m.
Approx. Bed Size Required:	488.51 square meters.
Average Cover Over Chambers:	N/A .

System Components

Amount Of Stone Required:	518 cubic meters
Volume Of Excavation (Not Including Fill):	819 cubic meters
Total Non-woven Geotextile Required:	1377 square meters
Woven Geotextile Required (excluding Isolator Row):	0 square meters
Woven Geotextile Required (Isolator Row):	60 square meters
Total Woven Geotextile Required:	60 square meters
Impervious Liner Required:	0 square meters



CROZIER
CONSULTING ENGINEERS

Project:	Ancaster Townhouse
Project No.:	2736-7210
File:	
Design by:	C.Buscher
Date:	2024.11.27
Updated:	

Ancanster Townhouse South Tank SSD

Pond Stage - Storage - Discharge Calculations

E.D. Orifice Diameter:	0.250	m
E.D. Orifice Invert Elevation:	220.10	m
Secondary Orifice Diameter:	0.525	m
Secondary Orifice Elevation:	220.40	m

Elev. (m)	Storage Volume (cu.m)	Depth Above E.D. Invert (m)	ED Orifice Discharge (cu.m/s)	Depth Above Secondary Invert (m)	Secondary Discharge (cu.m/s)	Total Discharge (cu.m/s)	Storage (ha-m)
220.10	0	0.00	0.0000	0.00	0.0000	0.0000	0.000
220.15	15	0.05	0.0094	0.00	0.0000	0.0094	0.002
220.20	30	0.10	0.0187	0.00	0.0000	0.0187	0.003
220.25	46	0.15	0.0230	0.00	0.0000	0.0230	0.005
220.35	85	0.25	0.0500	0.00	0.0000	0.0500	0.009
220.40	119	0.30	0.0590	0.00	0.0027	0.0617	0.012
220.46	153	0.36	0.0668	0.06	0.0312	0.0980	0.015
220.51	187	0.41	0.0738	0.11	0.0597	0.1336	0.019
220.56	220	0.46	0.0802	0.16	0.0883	0.1685	0.022
220.61	253	0.51	0.0861	0.21	0.1168	0.2029	0.025
220.66	286	0.56	0.0917	0.26	0.1453	0.2370	0.029
220.71	318	0.61	0.0969	0.31	0.1332	0.2301	0.032
220.76	349	0.66	0.1018	0.36	0.1920	0.2938	0.035
220.81	381	0.71	0.1065	0.41	0.2366	0.3432	0.038
220.86	412	0.76	0.1111	0.46	0.2741	0.3852	0.041
220.91	442	0.81	0.1154	0.51	0.3070	0.4224	0.044
220.96	472	0.86	0.1196	0.56	0.3367	0.4563	0.047
221.01	501	0.91	0.1236	0.61	0.3640	0.4877	0.050
221.07	529	0.97	0.1276	0.67	0.3894	0.5170	0.053
221.12	556	1.02	0.1314	0.72	0.4133	0.5446	0.056
221.17	583	1.07	0.1350	0.77	0.4358	0.5708	0.058
221.22	608	1.12	0.1386	0.82	0.4572	0.5959	0.061
221.27	632	1.17	0.1421	0.87	0.4777	0.6198	0.063
221.32	655	1.22	0.1456	0.92	0.4973	0.6429	0.065
221.37	674	1.27	0.1489	0.97	0.5162	0.6651	0.067
221.42	692	1.32	0.1522	1.02	0.5344	0.6866	0.069
221.47	707	1.37	0.1554	1.07	0.5520	0.7074	0.071
221.52	723	1.42	0.1585	1.12	0.5691	0.7276	0.072
221.57	738	1.47	0.1616	1.17	0.5856	0.7472	0.074
221.62	753	1.52	0.1646	1.22	0.6017	0.7663	0.075
221.67	768	1.57	0.1676	1.27	0.6174	0.7850	0.077
221.73	783	1.63	0.1705	1.33	0.6327	0.8032	0.078
221.75	791	1.65	0.1719	1.35	0.6403	0.8122	0.079
221.78	799	1.68	0.1733	1.38	0.6477	0.8210	0.080

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	Yes
Project Name:	South Tank
Engineer:	Charles Buscher
Project Location:	New York
Measurement Type:	Metric
Required Storage Volume:	820.00 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Design Constraint Dimensions:	(20.01 m. x 50.00 m.)

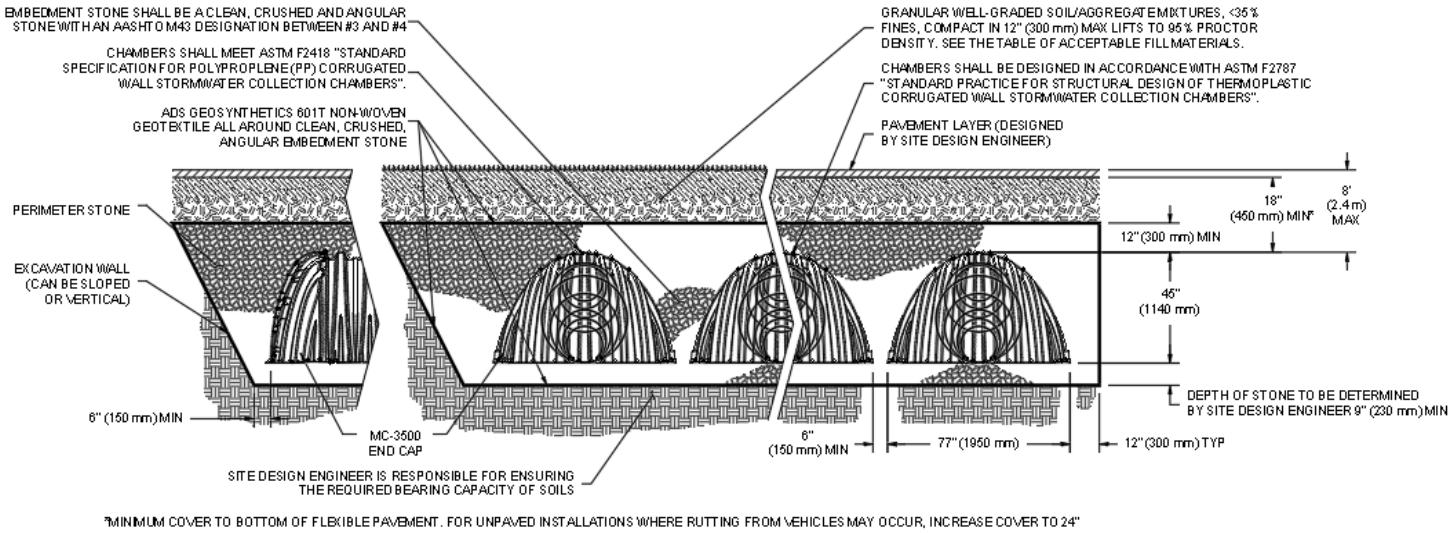
Results

System Volume and Bed Size

Installed Storage Volume:	835.91 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	157
Number Of End Caps Required:	16
Chamber Rows:	8
Maximum Length:	46.81 m.
Maximum Width:	17.51 m.
Approx. Bed Size Required:	803.38 square meters.
Average Cover Over Chambers:	N/A .

System Components

Amount Of Stone Required:	852 cubic meters
Volume Of Excavation (Not Including Fill):	1347 cubic meters
Total Non-woven Geotextile Required:	2192 square meters
Woven Geotextile Required (excluding Isolator Row):	122 square meters
Woven Geotextile Required (Isolator Row):	144 square meters
Total Woven Geotextile Required:	266 square meters
Impervious Liner Required:	0 square meters



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24"

FIGURES

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100 0m 100 200 300 400
SCALE: 1:5000

Town: Hamilton

No.	ISSUE	DATE: YYYY/MM/DD
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Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

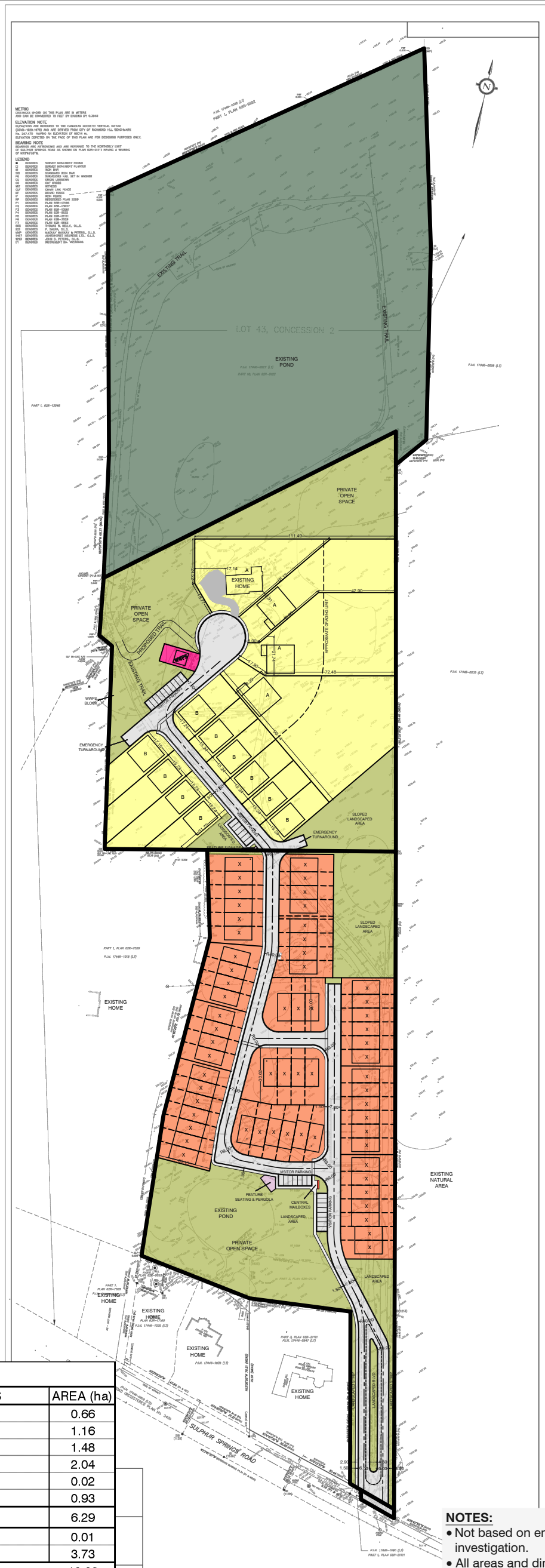
Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: SITE LOCATION PLAN

CROZIER
CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736-7210
Check By	Check By	Drawing
D.W.		FIG. 1



SITE STATISTICS		
DESCRIPTION	UNITS	AREA (ha)
DETACHED (15.24/50ft.)	10	0.66
DETACHED (18.29m/60ft.)	4	1.16
BLOCK TOWNHOUSE (7.62m/25ft.)	61	1.48
PARKS AND OPEN SPACE		2.04
WW PUMPING STATION		0.02
PRIVATE ROAD/SIDEWALK/PARKING		0.93
NET DEVELOPMENT TOTAL	75	6.29
ROAD WIDENING		0.01
NATURAL HERITAGE SERVICE		3.73
TOTAL	75	10.03
SERVICED ROAD LENGTH	700m	
VISITOR PARKING	31 spaces	

NOTES:

- Not based on engineering, enviornmental or any other required technical investigation.
- All areas and dimensions are approximate and subject to change.
- Boundary lines are based on available PDF of a plan of survey.

C:\Users\ashields\The Biglieri Group\TBG_Project - 24218\2 - TBG Design\1 - TBG Working Drawings\1 - AutoCAD\24218-CSP_4-24.10.15

CONCEPTUAL SITE PLAN

ADDRESS:
159 & 163 SULPHUR SPRINGS ROAD, ANCASTER

Project No:
24218

Scale:
1:2500

October 15, 2024

Designed By:
MP

APPROXIMATE WATER ELEV: 196.00

APPROXIMATE WATER ELEV: 196.00

SWMF1
UNDERGROUND STORAGE TANK
INLET INV: 205.30
OUTLET INV: 205.00
TOP OF TANK: 206.68

APPROXIMATE MEANDER LIMIT (BY GEOMORPHIX NOV 2024)

APPROXIMATE GRADING LIMIT

GRADING LIMIT NOT TO ENCROACH NATURAL HAZARD CONSTRAINT LIMTS

APPROXIMATE GRADING LIMIT

APPROXIMATE GRADING LIMIT

APPROXIMATE WATER ELEV: 220.08

APPROXIMATE GRADING LIMIT

SWMF2
UNDERGROUND STORMWATER TANK
INLET ELEV: 220.15
OUTLET ELEV: 220.10
TOP OF TANK ELEV: 221.78

APPROXIMATE EDGE OF ASPHALT

EXISTING CULVERT

EXISTING CULVERT

SULPHUR SPRINGS ROAD

LEGEND

PROPOSED MAJOR OVERLAND FLOW DIRECTION	PROPOSED ELEVATION
EXISTING OVERLAND FLOW DIRECTION	MATCH EXISTING ELEVATION
EXISTING MAJOR CONTOUR (1.0m)	EXISTING ELEVATION
EXISTING MINOR CONTOUR (0.5m)	EXISTING WATERCOURSE
PROPOSED MAX 3:1 SLOPE	MEANDER LIMIT (BY GEOMORPHIX NOV 2024)

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6. DO NOT SCALE DRAWINGS.

15 0m 15 30 45 60
SCALE: 1:750

Town: Hamilton

No.	ISSUE	DATE: YYYY/MM/DD
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Engineer

Engineer

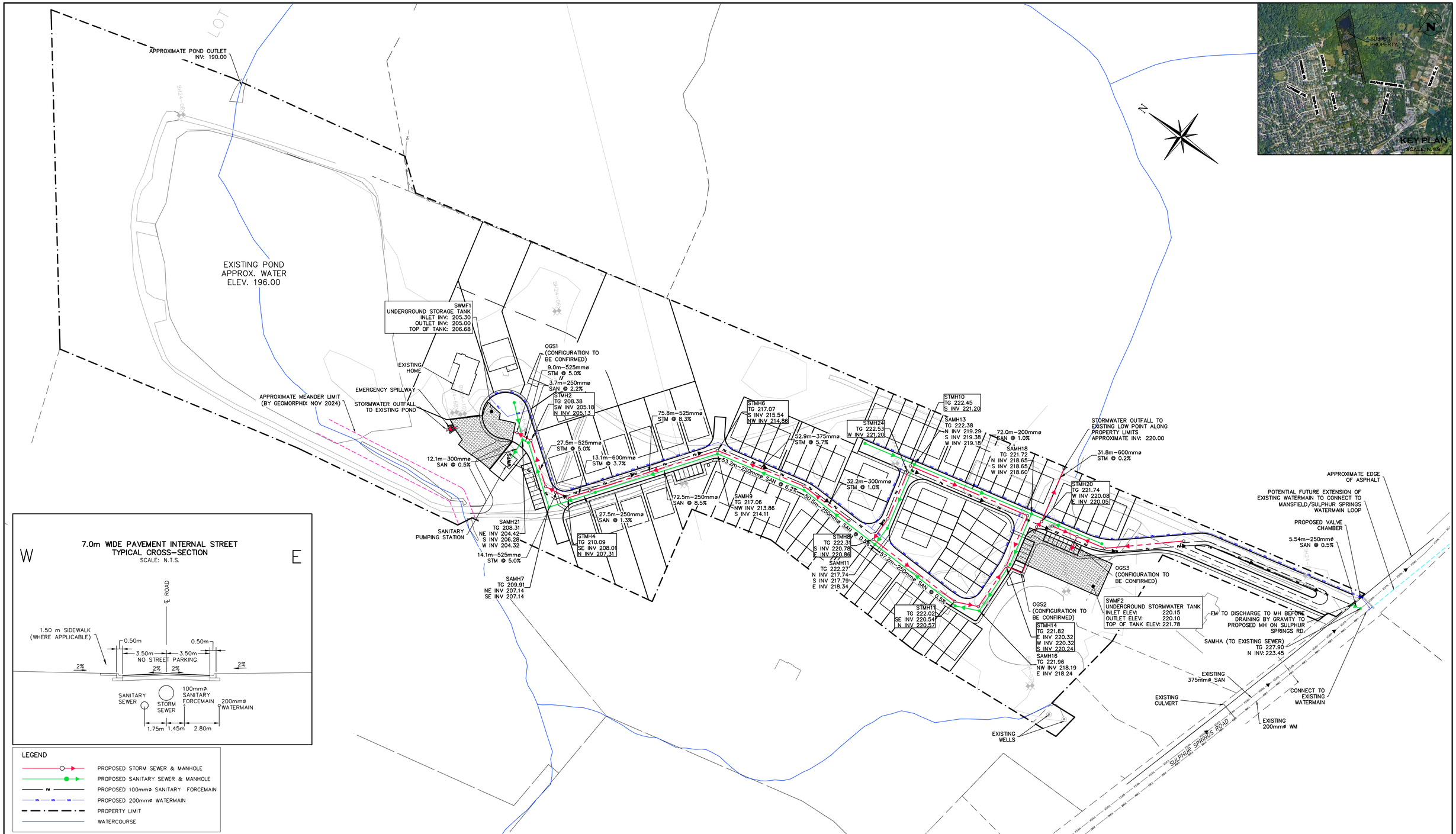
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: PRELIMINARY GRADING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By: R.D.M./D.T.	Design By: J.W./M.V.R.	Project: 2736-7210
Check By: D.W.	Check By:	Drawing: FIG. 3



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Town: Hamilton

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Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: GENERAL SERVICING PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736–7210
Check By	Check By	Drawing
D.W.		FIG. 4

05B
0.17 68

13
1.87 68

12
2.47 77

09A
1.07 77

SULPHUR SPRINGS ROAD

EXISTING CULVERT

05A
7.57 68

10
0.26 45%

7
2.73 71

LEGEND

- CATCHMENT AREA
- SUBJECT PROPERTY LIMITS
- 240.00 EXISTING MAJOR CONTOUR (2.0m)
- 241.00 PROPOSED WATERMAIN
- EXISTING OVERLAND FLOW DIRECTION
- ID 13.3|10% CATCHMENT I.D.
- AREA (ha) | PERCENT IMPERVIOUS OR CN VALUE

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50 0m 50 100
SCALE: 1:1500

Town: Hamilton

No.	ISSUE	DATE: YYYY/MM/DD
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Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: PRE-DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736-7210
Check By	Check By	Drawing
D.W.		FIG. 5

LEGEND

- CATCHMENT AREA
- SUBJECT PROPERTY LIMITS
- 240.00 EXISTING MAJOR CONTOUR (2.0m)
- 241.00 PROPOSED WATERMAIN
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- ID — CATCHMENT I.D.
- AREA (ha) | PERCENT IMPERVIOUS OR CN VALUE

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50 0m 50 100
SCALE: 1:1500

Town: Hamilton

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Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: POST-DEVELOPMENT DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736-7210
Check By: D.W.	Check By	Drawing: FIG. 6

TEMP. SILT TRAP 1
TOTAL DRAINAGE AREA=1.24ha
VOLUME REQUIRED:
125m³x1.24=155m³
VOLUME PROVIDED 185m³
L=20m W=10m DEPTH=1m

TEMP. SILT TRAP 2
TOTAL DRAINAGE AREA=1.10ha
VOLUME REQUIRED:
125m³x1.10=138m³
VOLUME PROVIDED 149m³
L=18m W=9m DEPTH=1m

TEMP. SILT TRAP 3
TOTAL DRAINAGE AREA=1.40ha
VOLUME REQUIRED:
125m³x1.40=175m³
VOLUME PROVIDED 185m³
L=20m W=10m DEPTH=1m

TEMP. SILT TRAP 4
TOTAL DRAINAGE AREA=1.22ha
VOLUME REQUIRED:
125m³x1.22=153m³
VOLUME PROVIDED 185m³
L=20m W=10m DEPTH=1m

TEMP. SILT TRAP 5
TOTAL DRAINAGE AREA=0.78ha
VOLUME REQUIRED:
125m³x0.78=98m³
VOLUME PROVIDED 116m³
L=16m W=8m DEPTH=1m

TEMP. SILT TRAP 6
TOTAL DRAINAGE AREA=0.27ha
VOLUME REQUIRED:
125m³x0.27=34m³
VOLUME PROVIDED 43m³
L=10m W=5m DEPTH=1m

1.24ha
1.10ha
0.78ha
1.40ha
1.22ha
0.27ha
1.27ha
0.95ha
2.73ha

EXISTING POND
EXISTING POND
EXISTING WATERCOURSE
APPROXIMATE MEANDER LIMIT (BY GEOMORPHIX NOV 2024)
ALL WORKS TO BE LOCATED OUTSIDE THE MEANDER LIMIT
TEMPORARY 450mmø CSP CULVERT CROSSING
TEMPORARY 450mmø CSP CULVERT CROSSING
EXTERNAL DRAINAGE AREA CLEAN WATER INTERCEPTOR SWALE OUTLET
APPROXIMATE EDGE OF ASPHALT
PROP. MUDMAT
EXTERNAL DRAINAGE AREA CONVEYED VIA INTERCEPTOR SWALE (SEE FIG. 5 FOR FULL EXTENTS OF EXTERNAL DRAINAGE AREAS)
SULPHUR SPRINGS ROAD

LEGEND

- EXISTING OVERLAND FLOW DIRECTION
- 240.00 EXISTING MAJOR CONTOUR (1.0m)
- 240.50 EXISTING MINOR CONTOUR (0.5m)
- x222.01 MATCH EXISTING ELEVATION
- HDSF PROPOSED HEAVY DUTY SILT FENCE
- APPROXIMATE DRAINAGE DIVIDE

20 0m 20 40 60 80
SCALE: 1:1000

Town: Hamilton

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Engineer

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Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: EROSION AND SEDIMENT CONTROL PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736-7210
Check By: D.W.	Check By	Drawing: FIG. 7

CUT / FILL ANALYSIS			
Minimum Elevation	Maximum Elevation	Color	VOL (cum)
−2.92	−1.50		1195
−1.50	−0.70		4415
−0.70	−0.30		4741
−0.30	−0.05		4873
−0.05	0.05		2296
0.05	0.30		5038
0.30	1.50		11862
1.50	2.50		2316
2.50	4.05		549

SULPHUR SPRINGS ROAD

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LEGEND

240.00 EXISTING MAJOR CONTOUR (2.0m)

241.00 EXISTING MINOR CONTOUR (1.0m)

15 0m 15 30 45 60

SCALE: 1:750

Town: Hamilton

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Engineer

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Engineer

Project: ANCASTER TOWNHOME DEVELOPMENT
159 & 163 SULPHUR SPRINGS ROAD
CITY OF HAMILTON

Drawing: CUT FILL PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
R.D.M./D.T.	J.W./M.V.R.	2736−7210
Check By	Check By	Drawing
D.W.		FIG. 8